

**Environmental Assessment
for
American Colloid Company**

**Amendment to Plan of Operations
SDM 77813**

EA No. MT040-2008-021

**Bureau of Land Management
Miles City, MT Field Office
Belle Fourche, SD Field Office**

April, 2008

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Abbreviation and Acronyms

ACC	American Colloid Company
AMP	Allotment Management Plan
AUMs	Animal Unit Months
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council on Environmental Quality
dB	Decibels
DENR	South Dakota Dept. of Environment and Natural Resources
DM&E	Dakota, Minnesota & Eastern Railroad Corporation
EA	Environmental Assessment
EPA	Environmental Protection Agency
MGP	Mixed Grass Prairie
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
PSD	Prevention of Significant Deterioration
RFD	Reasonable Foreseeable Development
RMP	South Dakota Resource Management Plan
SCD/BUD	States Sufficient Credible Data/Beneficial Use Data
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
USDA	U. S. Dept. of Agriculture
VOC	Volatile Organic Compounds
VRM	Visual Resource Management

Chapter 1

Purpose of and Need for the Proposed Action

1.1 Introduction

American Colloid Company (ACC) has submitted an amendment to its existing Plan of Operations SDM 77813 to the Bureau of Land Management (BLM) South Dakota Field Office, located in Belle Fourche, South Dakota and Applications for Large Scale Mining Permits to the South Dakota Department of Environment and Natural Resources (DENR), Minerals and Mining Program in Pierre, South Dakota.

The applications are known as the Shear/Clarkson West Permit and the Shear/Clarkson East Permit. Because the lands are not contiguous, DENR requires that they be covered under separate mining permits (Figure 1.1). The legal descriptions of the land contained in the Shear/Clarkson Permits can be found in Appendix 1.

The Shear/Clarkson Permits would add 844.8 acres to the existing plan - 118 acres are BLM surface and 726.8 acres are private surface. Proposed mining would affect approximately 363.2 acres on the Shear/Clarkson Permits over a period of 10 years. This includes approximately 68 acres on BLM surface and approximately 295 acres on private surface.

The Shear/Clarkson Permit projects are located in Butte County, South Dakota, approximately 7 to 12 miles northwest of Belle Fourche and one mile north of U.S. Highway 212. To aid in discussion, the project is separated into the West Permit and the East Permit, separated by about one mile (Figure 1.1).

The location is along the top and flanks of a prominent ridge system. Access is directly onto Highway 212 at existing approaches.

ACC currently has the following acreages under permit in South Dakota (Table 1.1):

Permit #6	6,469.52 acres
Permit #312	240.00 acres
Permit #29	400.00 acres
Permit #465	85.50 acres
<u>Permit #469</u>	<u>252.00 acres</u>
Total	7,447.02 acres

Of this total, about 1,101.28 acres are BLM lands and 6,345.74 acres are privately owned. About 62.7 acres of BLM lands have been disturbed by mining but have been reclaimed.

Since the South Dakota mining law went into effect in 1971, approximately 583.8 acres have been disturbed within ACC's current permit boundaries and about 524.9 acres have been reclaimed through the seeding stage. About 58.9 acres are currently under some phase of mining.

It is anticipated that mining will be active on the project for less than 30 days/year over a 10-year period; however, the mining schedule will depend upon weather conditions, clay qualities, and customer clay needs.

Not all lands within the permit boundaries are allowed to be disturbed. Only those lands which are specifically designated for mining or mine-related purposes are allowed to be disturbed. Those areas are shown on the mine plan maps which accompany the permit applications, and are considered to be part of the BLM's Plan of Operations for the mine if approved, or approved as modified, via the decision resulting from this EA.

1.2 Agency Roles and Responsibilities

The rough draft of this EA was prepared by ACC and submitted to BLM for review, revision, and finalization. Although initially written by ACC, BLM is fully responsible for the content, analysis and conclusions found in this EA and related documents. The BLM is also responsible for conducting public meetings, developing the alternatives, coordinating with the proponent, collecting public comments and conducting consultations.

Figure 1.1 Shear/Clarkson Permits

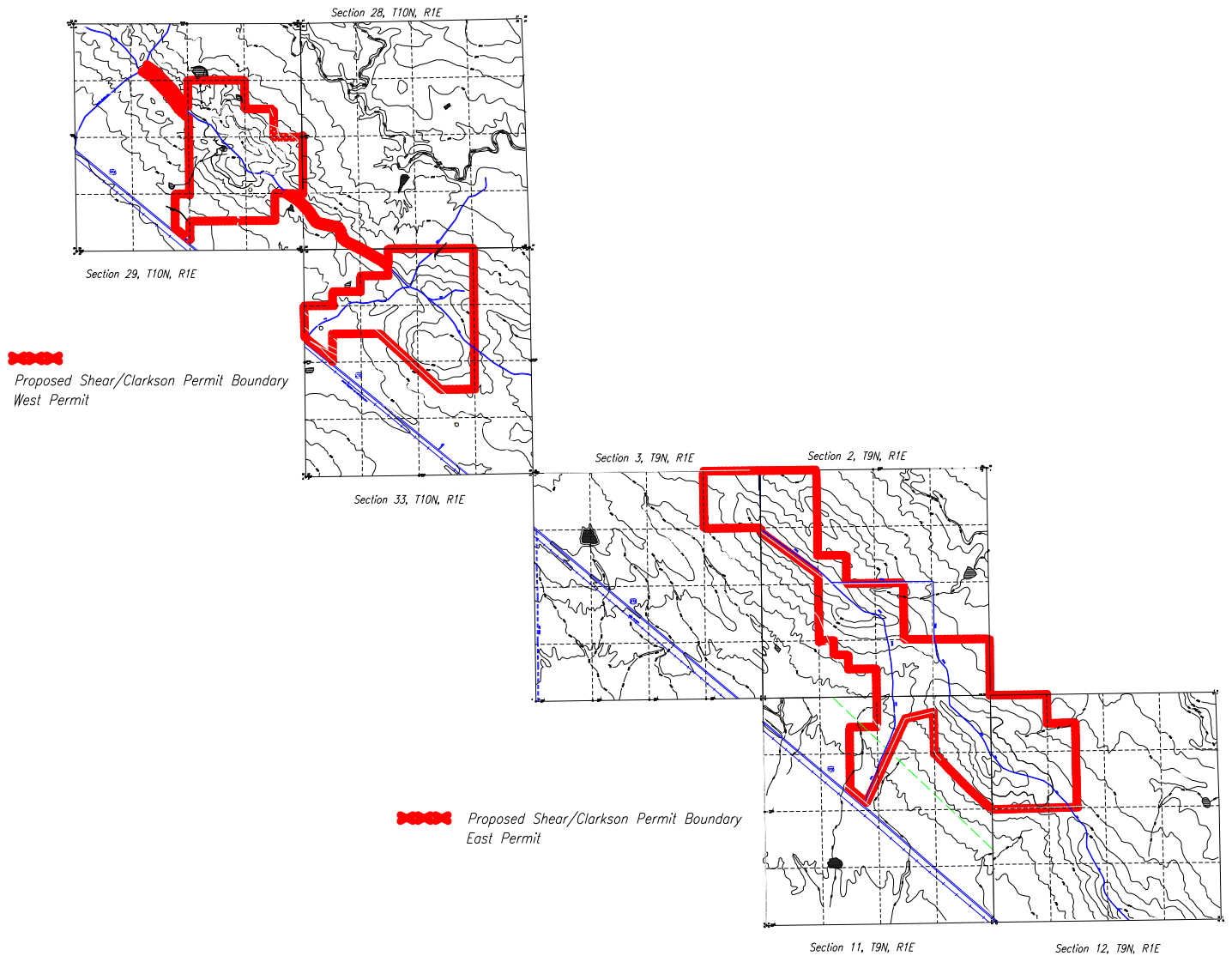
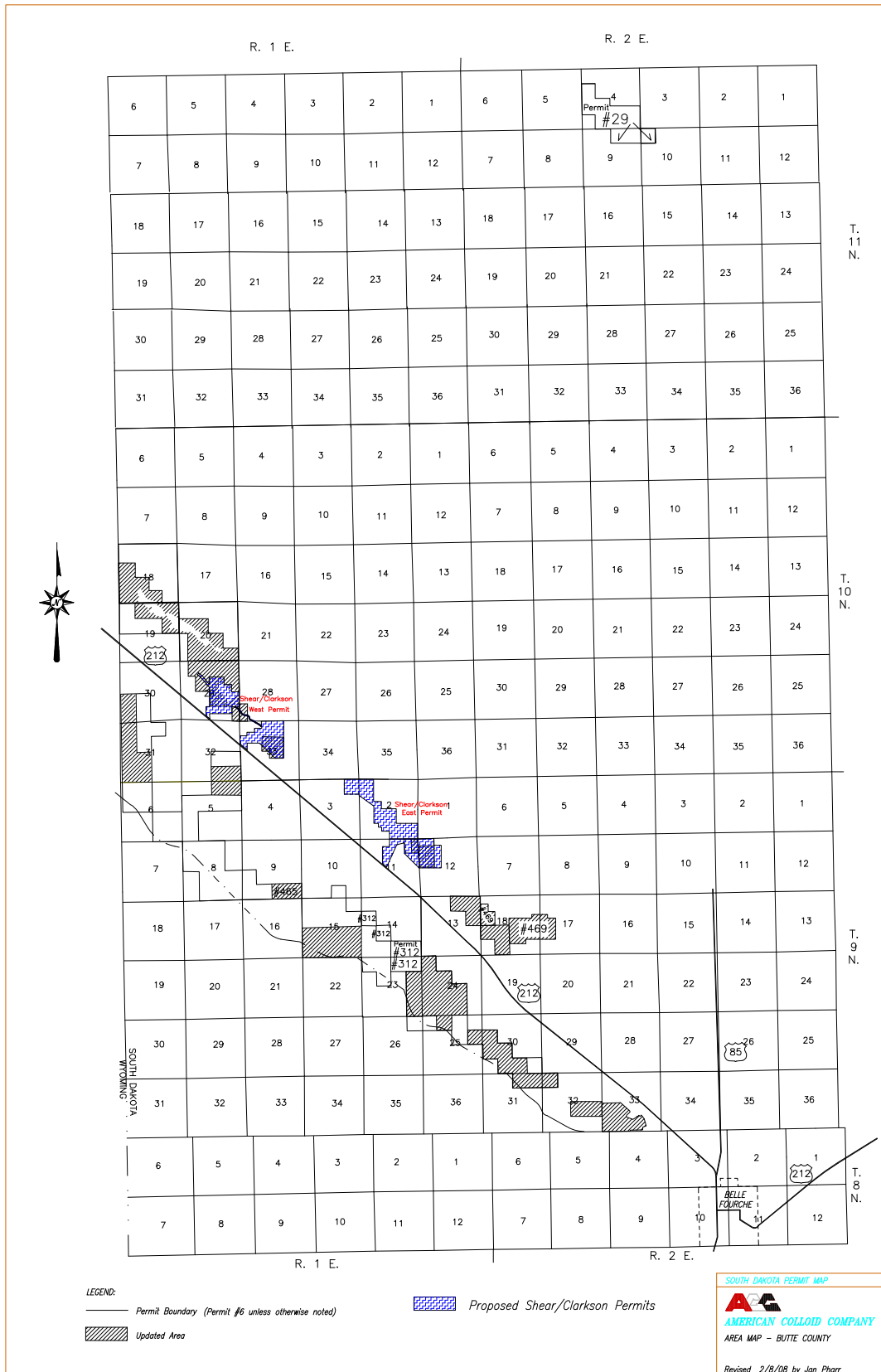


Figure 1.2 ACC Permitted Lands in South Dakota



Bureau of Land Management

Bentonite is a clay mineral and has been determined to be locatable under the general mining laws of 1872. The right to mine and the ownership of the bentonite on federal and some split estate lands is obtained by filing and maintaining mining claims. The federal regulations, which are used to regulate locatable mineral exploration and development on BLM administered public lands are called the Surface Management of Mining Claims Under the General Mining Laws, found at 43 CFR 3809, which are commonly referred to as the “3809” regulations. These regulations require mining claimants and /or operators to submit a Plan of Operations (for disturbances greater than 5 acres) for BLM’s review and approval. The plan must contain detailed information about the mining proposal and protective measures so that “Unnecessary or Undue” degradation does not occur to the federal lands. The operator must also comply with the performance standards set forth in 43 CFR 3809.420.

The Federal authority for locatable minerals, under the surface management regulations, extends only to federally owned surface or to some split estate lands, obtained under the Stock Raising Homestead Act. The regulations at 43 CFR 3809.411 directs BLM to prepare an environmental review under NEPA for a new Plan of Operations or a substantial modification to an existing plan. The surface management regulations also require the operator to submit a bond which covers 100% of the estimated cost of reclamation on BLM lands.

The South Dakota Resource Management Plan (RMP), approved in November, 1985 governs the management of federal lands (surface and minerals) in this area. All future management actions must conform to the decisions made in the RMP.

The following authorities are used to process and evaluate bentonite mining applications: the National Environmental Policy Act (NEPA) of 1969; the Environmental Quality Improvement Act of 1970. These acts and policies provide BLM with the authority to manage and administer public lands. Additional guidance and regulations are set forth in the 40 CFR 1500 regulations (Protection of Environment), 43 CFR 1601(Planning, Programming and Budgeting), and 43 CFR 3809 (Surface Management).

State of South Dakota

The legislation that regulates and controls bentonite mining operations in South Dakota is the South Dakota Mined Land Reclamation Act. This law and its approved rules place operational guidance and limitations on a project during its life, and provides for the reclamation of land subjected to open cut materials mining. The basic standard is that post-mining the land would be stable and meet its beneficial use, which is usually designated by the landowner.

The Act requires that a reclamation bond, cash deposit or other financial instrument be submitted to the state to cover the complete costs of reclaiming the site to its approved, post-mining land use. The permit decision is based upon whether or not the proponent has met the requirements of the Mined Land Reclamation Act, rules, and other laws pertaining to the proposed action.

The BLM and the State of South Dakota do not have an agreement which allows the Secretary of the Interior to be named as an obligee on a reclamation surety held by the state. Therefore, the BLM and the State of South Dakota will each hold separate reclamation bonds for this proposal.

1.3 Purpose and Need for the Action

The ACC Company's need is to be assured of the continuation of a supply of bentonite minerals, via an orderly, efficient and environmentally responsible mining of the bentonite resource. These lands are open to mineral entry, and valid mining claims have been filed on them. The mining claimant has the right to mine and develop the mining claims as long as it can be done without causing unnecessary or undue degradation and is in accordance with pertinent laws and regulations.

Bentonite is an important industrial mineral. The ACC Company's purpose of the proposed action is to meet customer clay needs. The various grades of bentonite have different uses. Bentonite has unique chemical and physical properties and is called "the clay of 1000 uses". The principal markets for bentonite include metal casting for the formation of sand molds, iron ore pelletizing, well drilling, clumping cat litter, pharmaceutical and cosmetic industries, pelletizing aids in animal feeds, carriers for agri-chemicals, etc. Environmental products include liners for landfills, waterproofing panels, ground water products, bentonite-based flocculants to remove emulsified oils and heavy metals from waste water, bentonite-based grout, and many others. Therefore, a company may have pits open simultaneously in more than one area and in different bentonite beds, due to the need for bentonite with varying characteristics to meet the demands for products with different characteristics, as well as changing market demand.

BLM's need is to respond to the amendment filed on the current plan of operations. BLM's purpose is to evaluate the proposal, and assure that unnecessary or undue degradation does not result from the alternative selected.

1.4 Other Relevant Environmental Documents

- EA No. MT-020-78-7-54 for American Colloid Company, Plan of Operations SDM77813, August, 1997.
- Final Resource Management Plan, South Dakota Resource Area, Miles City District, November, 1985

1.5 BLM Decisions Required

BLM decision options regarding ACC's proposed Plan of Operations include: approve the Plan amendment subject to mitigation included in the amendment application and this EA, or deny approval of the Plan amendment if it is found that the proposal would result in unnecessary or undue degradation of the public lands (No Action Alternative).

1.6 DENR Decisions Required

The SD DENR decision options would include approve the permits as submitted, approve as modified, or deny them if it is found that mining could not be done in compliance with the Mined Land Reclamation Act.

1.7 Public Scoping and Issue Identification

1.8 Federal, State and Local Permits Or Required Consultations

Mined Land Reclamation Act, as amended

South Dakota DENR authorizes activities on private, State, and Federal Lands such as sand and gravel and bentonite mining.

BLM Plan of Operations SDM77813, as amended

The BLM authorizes mining activities on Federal surface estate, pertaining to locatable minerals such as bentonite via the authority found in federal regulations at 43 CFR 3809 “Surface Management of Mining Claims under the General Mining Laws”. The BLM generally does not have authority to regulate locatable mineral mining on private surface.

Storm Water Discharge Permit

DENR authorizes construction activities that may impact State Waters under the General Permit for Storm Water Discharges Associated Construction Activity Permit. ACC has a storm water discharge permit with DENR.

State Historic Preservation Office Consultation

Under Section 106 of the National Historic Preservation Act (NHPA) and regulations found at 36 CFR Part 800 BLM is required to consider the effects of its undertakings on cultural resources. As a result, for this undertaking, BLM required American Colloid to complete a Class III survey of the entire project area. A Class III survey is a pedestrian based survey of a target area conducted by a qualified archaeologist to identify the remains of prehistoric and historic cultural resources.

The BLM consulted with the State Historic Preservation Office (SHPO) as required by 36 CFR Part 800 and the SHPO concurred with our finding that no historic properties will be affected by this undertaking (historic properties are cultural resources eligible for the NRHP).

Tribal Consultation

The BLM is required to consult with tribes under the NHPA. In addition, BLM has a government-to-government relationship with tribes. To address our responsibilities BLM sent a letter to tribes that may have an interest in this undertaking. In that letter we asked tribes to contact BLM if they had an interest and/or concerns about this undertaking. Only one tribe responded, indicating that they did not have any concerns with this project.

Chapter 2

Alternatives, Including the Proposed Action

2.1 Introduction

This chapter discusses the Proposed Action and Alternative. Descriptions of current environmental resources at the American Colloid Company (ACC) project area and potential impacts resulting from the proposed action and alternative are presented in Chapters 3 and 4, respectively. Mitigation measures such as concurrent reclamation, reseeding, and erosion control are built into the proposed action. Others are identified in chapter 4 and will be incorporated into the authorization.

2.2 Proposed Action

The Shear/Clarkson Permit project involves adding 844.8 acres (118 acres of BLM surface and 726.8 acres of private surface) to ACC's existing permitted lands in the Belle Fourche, South Dakota area (Figure 1.1).

The project is separated into a West Permit and an East Permit, separated by about one mile. The West Permit covers 364.1 acres in sections 28, 29, and 33, T. 10 N., R. 1 E., Butte County, South Dakota. Of this, 18 acres are BLM lands and 346.1 acres are privately owned (Figure 2.1). It is estimated that about 177.2 acres on the West Permit would be affected by ACC's operation which includes 5.8 acres of BLM surface and 171.4 acres of private surface.

The East Permit covers about 480.7 acres in sections 2, 3, 11, and 12, T. 9 N., R. 1 E., Butte County, South Dakota. Of this, 100 acres are BLM lands and 380.7 acres privately owned (Figure 2.2). It is estimated that approximately 186 acres on the East Permit would be affected by ACC's operation. This includes 62.4 acres of BLM surface and 123.6 acres of private surface.

In summary, approximately 363.2 acres will be affected by ACC's proposed mine plan, which includes about 68 acres of BLM surface and 295 acres of private surface. It is anticipated that mining will be active on the project for less than 30 days/year over a 10-year period; however, the mining schedule will depend upon weather conditions, clay qualities, and customer clay needs.

Not all lands within the permit boundaries are allowed to be disturbed. Only those lands which are specifically designated for mining or mine related purposes are allowed to be disturbed. Those areas are shown on the mine plan maps which accompany the permit application and are considered to be part of BLM's Plan of Operations for the mine, if approved, or approved as modified, via the decision resulting from this EA.

Mining on the Shear/Clarkson Permits will occur in five proposed pit sequences on the West Permit and four proposed pit sequences on the East Permit. The mining operation will consist of stripping several small pits and backfilling one into the other. New haul road segments will be constructed over non-maintained existing trails and over backfilled pits or proposed pits within the mining sequences. Any newly constructed road spurs will be reclaimed. No permanent main stretches of haul road are proposed. ACC will surface mine to an estimated maximum depth of 50 feet, although in many places, the bentonite crops out near the surface.

The following equipment will be most commonly used in ACC's mining operations: Caterpillar 637 Scrapers, Caterpillar D-9 Dozers, Caterpillar 988 Front-end loaders, Caterpillar patrol/blade, haul trucks and water wagons.

Topsoil from all affected areas will be salvaged with rubber-tired scrapers prior to disturbance. The depth of topsoil and subsoil salvage depends on the type and availability of soil and ranges from 0 to 10 inches for topsoil and 0 to 22 inches for subsoil, as determined by a professional soils survey conducted over the project. The soils survey identified some shale outcrop soils in the proposed mining areas. It was recommended that these soils not be salvaged and that they not be used as surface reclamation materials.

Topsoil and subsoil for areas designated as temporary overburden stockpiles, haul road segments, and pits will be stockpiled. These materials will be clearly marked with signs reading "Topsoil" and "Subsoil". Topsoil and subsoil not stockpiled will be direct hauled (livespread) onto previously backfilled and contoured areas. Prior to spreading topsoil, all compacted areas will be ripped with shanks attached to the D-9 Cat or patrol/blade. Ripping will be from 10 to 12 inches deep and done in two passes at right angles. This procedure has been used for several years and has proven to be an effective reclamation procedure.

Overburden from each pit will be ripped with a D-9 dozer and stripped using scrapers. It will be temporarily stockpiled or backfilled into a previously opened pit except in two areas of the West Permit where overburden will be blended into the side of the ridge.

Bentonite will be removed and either stockpiled with scrapers or extracted from the pit with front-end loaders and loaded onto haul trucks which will haul the bentonite to ACC's processing plants at Belle Fourche, South Dakota or Colony, Wyoming.

Open pits will be backfilled in a "tier" system (Figure 2.3). Generally, the material found lowest in the pit is the poorest quality for revegetation and is replaced at the bottom of the pit. When the final contour configuration is approached, the tiers are blended into surrounding topography. Past experience has shown that overburden swells sufficiently due to breaking up of the platy shale to compensate for bentonite removal. As a result, the post-mine contours will be approximately equal to the original contours except where they have been smoothed or blended in and will be suitable for the primary post-mine land use of livestock grazing.

Reclamation will occur in conjunction with mining and immediately following mining. During the reclamation phase of the operation, after the pits are backfilled and contoured, subsoil and topsoil will be respread. This will be followed by either ripping with a motor patrol or immediately seeding with a modified chisel plow/range seeder. This method provides an uncompacted, moderately rough seedbed which reduces erosion and traps moisture in the furrows for vegetation establishment.

Protective berms will isolate mining disturbance from undisturbed areas and help reduce the amount of storm water run-off which enters a mining area. Controlling the run-on will help reduce run-off. In addition, sediment control features such as sediment control fences, water bars, pits, or rows of straw bales will be employed where run-off threatens to carry excessive sediment to undisturbed lands.

Most of the reclaimed land will be seeded with a grass/forb mixture that is perennial and self-sustaining without the use of fertilizers or irrigation. Since 1988, ACC has included Winter wheat in the seed mix as a nurse crop at the individual species application rate of 10 pounds PLS/acre. This practice has demonstrated that the nurse crop concept works well in controlling erosion and weed invasion. Within three years after the initial seeding, little evidence is seen of wheat as the planted species become established.

The following describes the species in ACC's seed mix:

- Western wheatgrass - a long-lived, sod-forming, drought resistant perennial native grass. It is one of the first grasses to grow on the range in the spring. It cures well on the stem and retains its protein content, which provides for good winter grazing.
- Slender wheatgrass - a perennial native bunchgrass with a fibrous root system. Seedlings are strong and easily established. It is drought tolerant, moderately salt tolerant, and very cold tolerant.
- Streambank wheatgrass - a sod-forming perennial native grass. It is drought tolerant and moderately tolerant to saline or alkaline soils. It has strong rhizomes and spreads rapidly to form a good ground cover. It has special uses in soil and water conservation work and offers excellent protection against soil erosion.
- Green needlegrass - a long-lived perennial native grass. It has short awns, which are not harmful to animals, and it is a valuable component of the range. It grows to a height of 1.5 to 3 feet and provides good cover for duck nesting and small mammals. It produces a good yield of forage that is palatable and nutritious early in the season.
- To increase diversity on the reclaimed land, available native forbs will be added to the seed mix each year. Depending on cost and availability, following are some of the species that may be used: Purple prairie clover, White prairie clover, Western yarrow, and annual wild Sunflower.

If any solid waste is generated during mining operations, it will be disposed of at ACC's permitted landfill on a biweekly basis.

2.3 Alternative A – No Action BLM

The No Action Alternative involves rejecting the amendment application. The BLM could deny or withhold approval of the amendment application if it found the proposals would result in unnecessary or undue degradation of the public lands. This alternative represents the status quo. Mining under the current plan would still occur until permitted reserves are exhausted.

Figure 2.1 Surface Ownership of Shear/Clarkson West Permit

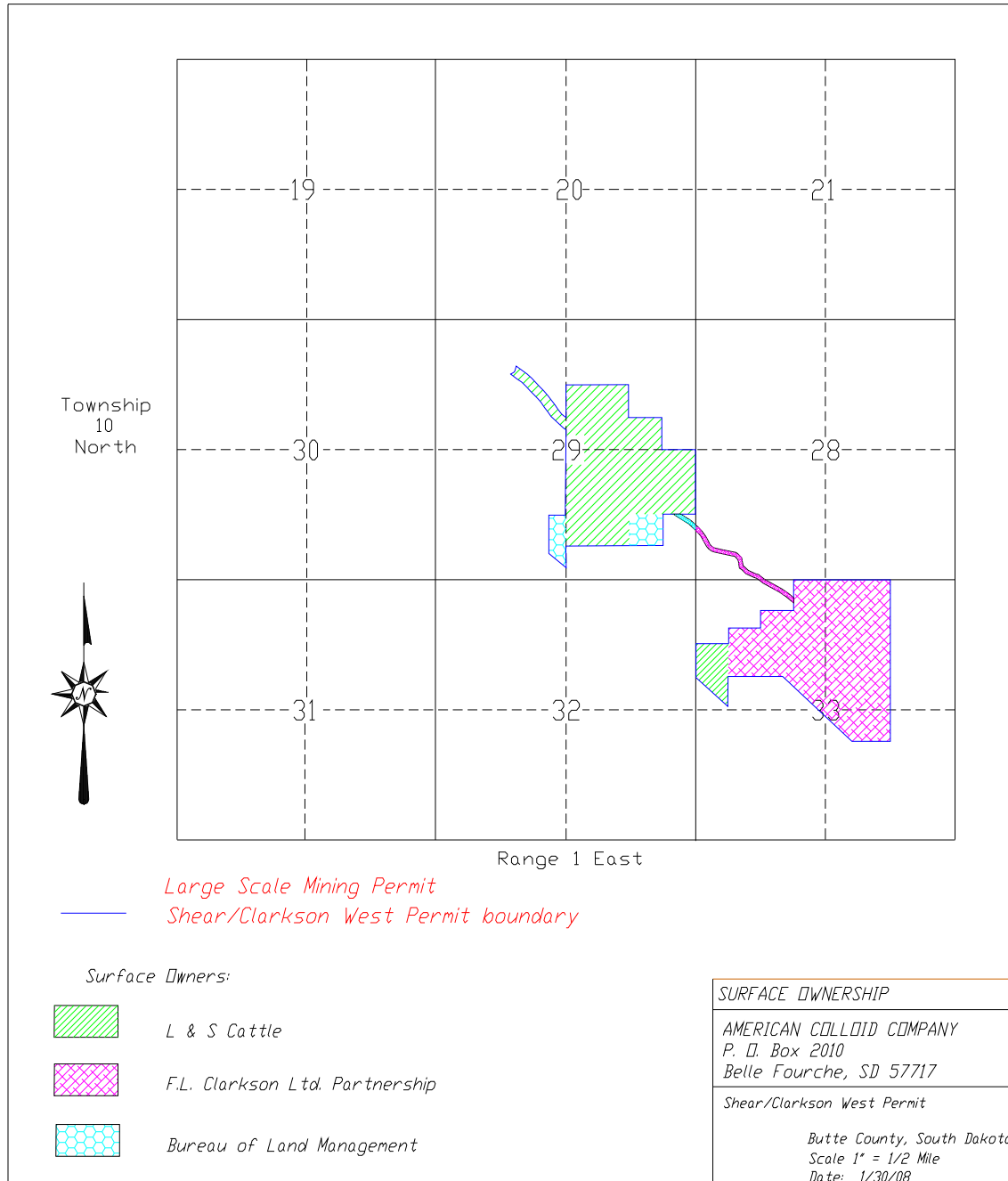


Figure 2.2 Surface Ownership of Shear/Clarkson East Permit

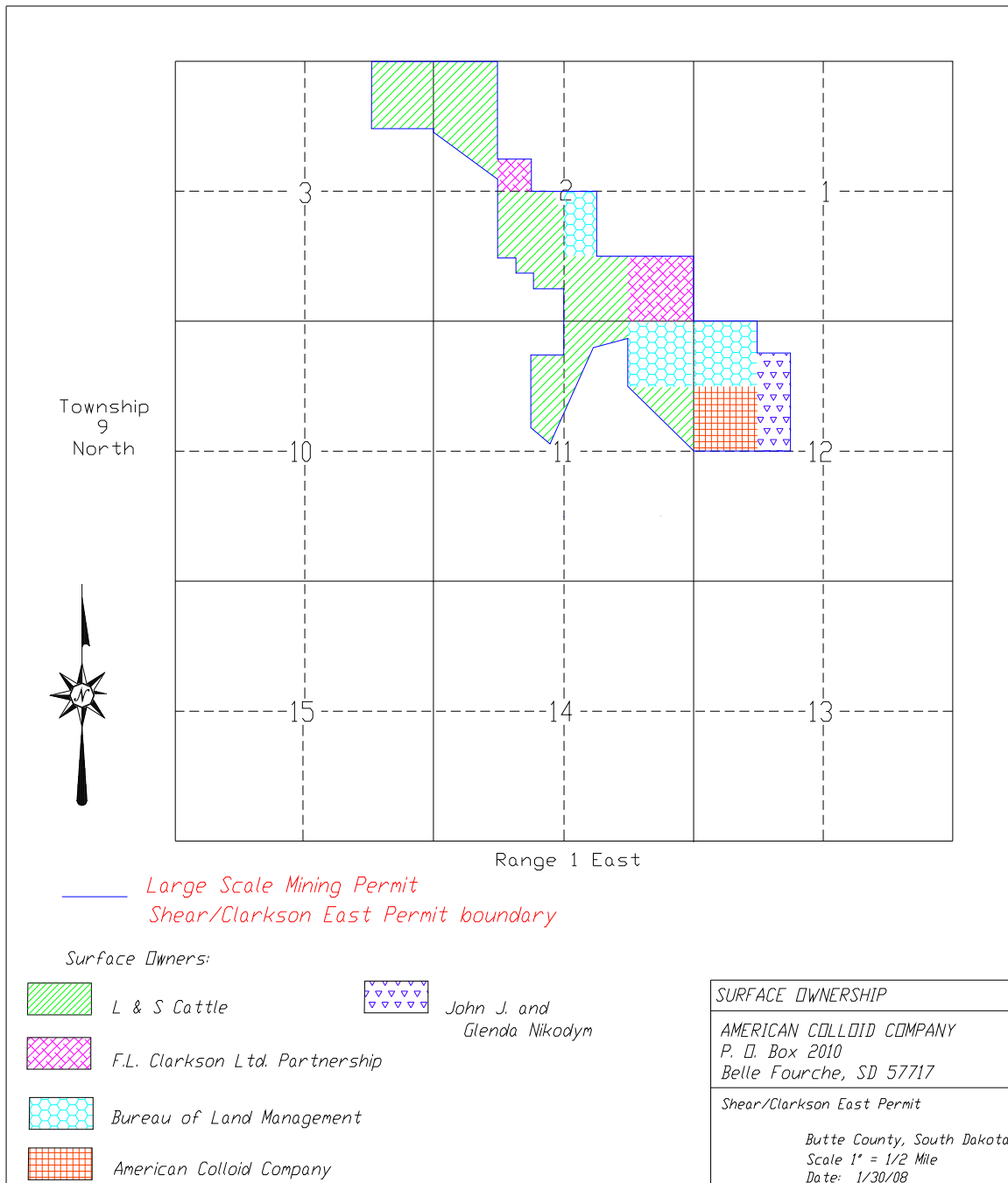
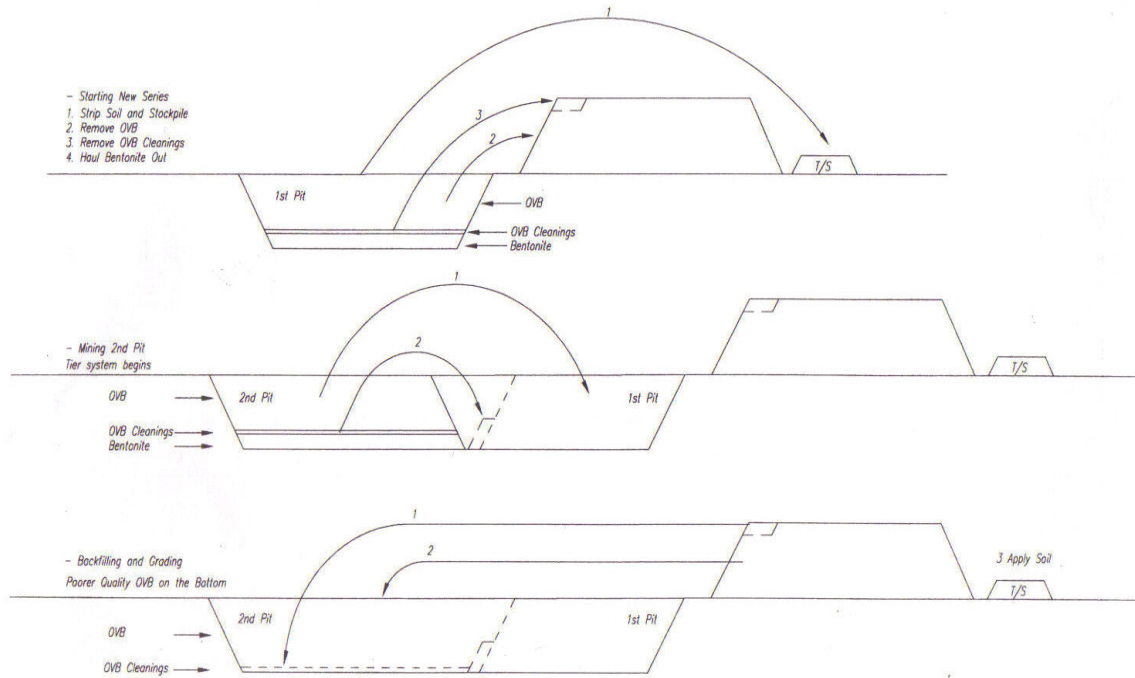


Figure 2.3 Tier System

**Example of ACC's Tier System
Backfilling and Grading**



Chapter 3

Affected Environment

3.1 Introduction

Baseline investigations were completed on the proposed Shear/Clarkson Permits in order to characterize environmental resources. This chapter provides a summary of those investigations. In the following sections, "project area" refers to the general area surrounding project components associated with ACC's existing mine activity. The general project area is shown on Figure 1.1. Study area boundaries for each discipline are based on where potential direct and indirect impacts are likely to occur. The NEPA, CEQ regulations, BLM policy and DENR regulations require that potential impacts be addressed for the following critical elements:

- Wetlands/Riparian Zones
- Air Quality
- Farmlands, Prime/Unique
- Floodplains
- Water Quality (drinking/surface/ground)
- Threatened and Endangered Species
- Cultural Resources
- Areas of Critical Environmental Concern
- Wild and Scenic Rivers
- Wilderness Areas
- Native American Religious Concerns
- Hazardous Materials/Waste
- Environmental Justice
- Invasive, Nonnative Species

Of the fourteen critical elements required to be addressed, floodplains, prime and unique farmlands, areas of critical environmental concern, wild and scenic rivers, and wilderness areas do not occur within the project area and will not be discussed further.

3.2 Location and Topography

The permit area is located in western South Dakota, in Butte County, about 7 to 12 miles northwest of Belle Fourche. It is also north of Highway 212 and about 1½ miles east of the South Dakota/Wyoming state line. To aid in discussion the proposed permits are divided into a West Permit and an East Permit.

The Shear/Clarkson lands lie along the top and flanks of a prominent northwest/southeast oriented ridge system that runs parallel to Highway 212. The landscape exhibits various erosion remnants, such as cuts and eroded ridge slopes. Drainage is by ephemeral channels off the main ridge which serves as a dividing line between two main drainages in the area. Crow Creek is one of the main drainages and is located approximately 2,000 feet to 4,000 feet north of the ridge, and the other drainage, Middle Creek, is 4,000 feet to the south and is south of Highway 212.

At its nearest point, mining will be approximately 1,500 feet from Crow Creek on the West Permit and approximately 3,000 feet on the East Permit.

Elevations range from approximately 3,220 feet to 3,320 feet on the West Permit, and range from 3,110 feet to 3,250 feet on the East Permit

3.3 Climate

The climate of the area is one of extremes. As an example, the 27-year average temperature for March is 32.3 degrees Fahrenheit (F) and the daily extremes for March range from minus 32 degrees F on 3/11/98 to 82 degrees F on 3/14/07. For July the 27-year average temperature is 71.4 degrees F; the daily extremes for July range from 34 degrees F on 7/1/84 to 110 degrees F on 7/29/06.

Precipitation is likewise erratic and ranges from a low of 7.9 inches recorded in 1985 to 24 inches in 1982. The 27-year average annual precipitation is 13.85 inches (Western Regional Climate Center).

Winds are generally from the northwest and are subject to wide fluctuations.

3.4 Air Quality

Under the Clean Air Act of 1970 (as amended), EPA developed primary and secondary National Ambient Air Quality Standards (NAAQS) for each of the seven criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, fine particulate matter and sulfur dioxide. These standards establish pollution levels in the United States that cannot legally be exceeded during a specified time period.

Primary standards are designed to protect human health, including “sensitive” populations, such as people with asthma and emphysema, children and senior citizens. Primary standards are designed for the immediate protection of public health, with an adequate margin of safety, regardless of cost.

Secondary standards are designed to protect public welfare, including soils, water, crops, vegetation, buildings, property, animals, wildlife, weather, visibility, and other economic, aesthetic and ecological values, as well as personal comfort and well-being. Secondary standards were established to protect the public from known or anticipated effects of air pollution. A list of these standards are shown on Table 3.4-1.

The NAAQS establish upper limits for concentrations of specific air pollutants. Incremental increases in the ambient concentration of criteria pollutants are regulated under the Prevention of Significant Deterioration (PSD) program. The program is designed to limit the incremental increase of specific air pollutants above a legally defined baseline level, depending on the classification of a location. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict. The project area and surrounding areas are classified as PSD Class II.

The NEPA analysis comparisons to PSD Class I and II increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD increment consumption analysis. The determination of PSD increment consumption is an air quality regulatory agency responsibility.

Pollutants are limited within the project area with only a few industrial facilities and residential sources in the community and isolated ranches. In addition, the good atmospheric dispersion conditions in the project area typically result in low concentrations of criteria air pollutants. These factors generally contribute to relatively low ambient air pollutant concentrations.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six (some number it as seven) principal pollutants, which are called "criteria" pollutants. They are listed below. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

Table 3.4-1 Ambient Air Quality Standards

	National Ambient Air Quality Standards ⁽⁹⁾				South Dakota Ambient Air Quality Standards ⁽¹⁰⁾			
	Primary Standards		Secondary Standards		Primary Standards		Secondary Standards	
Pollutant	Level	Averaging Time	Level	Averaging Time	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None		Same as National		Same as National	
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾			Same as National		Same as National	
Lead	0.15 µg/m ³ ⁽²⁾	Rolling 3-Month Average	Same as Primary		None			
	1.5 µg/m ³	Quarterly Average	Same as Primary		Same as National		Same as National	
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary		Same as National		Same as National	
Particulate Matter (PM ₁₀)	150 µg/m ³	24-hour ⁽³⁾	Same as Primary		150 µg/m ³	24-hour ⁽¹⁾	Same as Primary	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽⁴⁾ (Arithmetic Mean)	Same as Primary		Same as National		Same as National	
	35 µg/m ³	24-hour ⁽⁵⁾	Same as Primary		Same as National		Same as National	
Ozone	0.075 ppm (2008 std)	8-hour ⁽⁶⁾	Same as Primary		None			
	0.08 ppm (1997)	8-hour ⁽⁷⁾	Same as Primary		Same as National		Same as National	

	std)					
	0.12 ppm	1-hour ⁽⁸⁾ (Applies only in limited areas)	Same as Primary		None	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m ³)	3-hour ⁽¹⁾	Same as National	Same as National
	0.14 ppm	24-hour ⁽¹⁾			Same as National	Same as National

⁽¹⁾ Not to be exceeded more than once per year.

⁽²⁾ Final rule signed October 15, 2008.

⁽³⁾ Not to be exceeded more than once per year on average over 3 years.

⁽⁴⁾ To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m³.

⁽⁵⁾ To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³ (effective December 17, 2006).

⁽⁶⁾ To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)

⁽⁷⁾ (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.

⁽⁸⁾ (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1.

(b) As of June 15, 2005 EPA revoked the [1-hour ozone standard](#) in all areas except the 8-hour ozone nonattainment [Early Action Compact \(EAC\) Areas](#).

⁽⁹⁾ <http://www.epa.gov/air/criteria.html#3>

⁽¹⁰⁾ <http://denr.sd.gov/des/aq/monitoring/ambientstandards.aspx>

3.5 Hydrology

3.5.1 Groundwater

According to South Dakota DENR, the nearest aquifer under the area is the Inyan Kara group of early Cretaceous age which is about 1,050 feet below the surface. It is divided into two separate sub-aquifers, Fall River and Lakota, both of which have an average thickness of 30' (Environmental Assessment dated 8/18/97 for MT-020-78-7-54).

Based on exploratory drilling, no important groundwater is known to exist above the deepest projected depth of mining on the Shear/Clarkson Permits.

Review of data from South Dakota DENR Water Rights Program in 2007, indicated no record of

any domestic wells in the Shear/ Clarkson Permit area. The nearest domestic use wells are at the Shear/Larsen ranch homes which are located north of Crow Creek, and approximately ½ to ¾ mile north of the Shear/Clarkson West Permit boundary.

The area within the permits is not a recharge area for aquifers. The sides of the ridges would take in a very limited quantity of water that later appears at the top of an impermeable layer as a wet spot or seep.

3.5.2 Surface Water

The surface water hydrology for the permit areas is characterized by unnamed ephemeral channels. The channels usually have a very low gradient and are usually very shallow, perhaps containing no distinct bank, and only a few feet wide. The depth and width are determined by such factors as the bank full discharge recurrence interval, flow velocity, soil type and vegetation. The channels and surrounding overflow areas are usually better vegetated than the surrounding uplands because of the run-on quantities of water. These channels usually only carry water as a result of snow melt, spring rains or heavy summer precipitation events. The gradient also plays an important part in the erodibility of the channel. If the gradient is overly steep for the type of vegetative root mass present, erosion and head cutting may occur. No perennial or intermittent drainages are located on the proposed permit area. Only ephemeral drainages will be affected by actual mining activity, and they will be re-established after mining.

The run-off from the area is comparatively high due to low infiltration potential of the clay soils. Landowners may excavate small dugouts to provide water for livestock. One small, shallow dugout is located at the edge of the West Permit; this pond often dries up in the summer months.

At its closest point, mining activity on the Shear/Clarkson project will be approximately 1,500 feet from Crow Creek on the West Permit and approximately 3,000 feet on the East Permit. Crow Creek is a tributary to the Belle Fourche River.

Since 2003, ACC has on-going water quality sampling at two locations along Crow Creek, approximately 1 ½ to 2 miles southeast of the Shear/Clarkson East Permit. The sample data will serve as baseline information for before and after mining on the Shear/Clarkson Permits.

3.6 Wetlands

There are no wetland features on the permit. However, there is one small, shallow dugout on the West Permit that often dries up in the summer that is outside of ACC's mine plan.

3.7 Wildlife

Thunderbird – Jones & Stokes Wildlife Consulting was contracted by ACC to gather baseline wildlife data for the Shear/Clarkson permitting project. In consultation with SD Game & Fish, a scope of work was developed, and wildlife surveys began in 2004. Grouse lek and raptor surveys are on-going through the life of the permits.

Grassland covers approximately 60% of the permitting project and is where approximately 70% of the mining and related activity will occur. Grasslands provide valuable wildlife habitat because big game species will concentrate on grassland plants during the spring and summer months.

Pronghorn

The pronghorn is the most frequently observed big game animal and is found year round in the sagebrush/grassland habitat in the area northwest of Belle Fourche.

Pronghorn use the greatest diversity of vegetation types in summer and the least in winter. In winter there is 90% use of the big sagebrush type; in spring there is 65% use of perennial grasslands by pronghorn, Amstrup, (1978). Pronghorn generally feed mainly on grasses in the spring, Beale and Smith, (1970).

Messenger (1978), studied pronghorn in northwestern South Dakota and found that shrub use was low in the spring and summer months as shown in Table 3.7-1:

Table 3.7-1 Shrub Use by Antelope

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
%Shrubs	96%	96%	95%	36%	36%	15%	6%	19%	45%	69%	95%	97%

Gocke, (1997), describes a joint Wyoming G&F/BLM/ Mobile Oil partnership where old sagebrush was mowed to increase diversity of young plants, grasses, and forbs. This project demonstrated that increased diversity in habitat means an increased diversity in wildlife and benefits to livestock as well.

During baseline studies conducted from February, 2004 through May, 2007, Pronghorn were seen on 290 occasions on or within one mile of the Shear/Clarkson Permits. Approximately ¼ of the time, they were seen within the Permit boundaries.

Sixty-four percent of the Pronghorn sightings were in sagebrush habitats, with 28% in grassland habits. Most sightings of pronghorn are made on the sagebrush/grassland flats in the area,

especially south of Highway 12. Pronghorn are occasionally observed very near active bentonite mining and will readily graze newly seeded reclaimed lands in the spring and summer.

Pronghorn herd size was generally smaller in the permit areas than in the surrounding perimeter, averaging 10.4 to 16.3 animals per herd, respectively.

Mule Deer and White-tailed Deer

Mule deer prefer shrubs in winter and grasses and forbs in summer. Pronghorn eat mostly new grasses in the spring, and in the summer broadleaf plants. During the winter, sagebrush and other shrubs serve as their primary foods, Wyoming Game & Fish Department. Carpenter, Wallmo, and Gill, (1979) found that when available, forbs and grasses are an important component of a winter diet for mule deer.

During the same survey period, Mule deer and White-tailed deer were seen occasionally in the riparian corridor along Crow Creek which is about 1,500' north of the West Permit and 3,000' north/northeast of the East Permit. Only 16 Mule deer herds were observed in the survey area (a one-mile perimeter of the Permit boundaries) over a three-year study period. No sightings occurred within the West or East Permit boundaries.

Only 6 White-tailed deer herds were observed in the survey area (a one-mile perimeter of the Permit boundaries) over a three-year study period. No sightings occurred within the West or East Permit boundaries.

Small Mammals

Three species of small mammals were captured during Jones & Stokes' trapping studies: Deer mouse, Thirteen-lined ground squirrel, and the Northern grasshopper mouse. The capture frequency was 10.0 captures/100 trap-nights. The Deer mouse was the most abundant small mammal captured, representing approximately 83% of the total.

Black-tailed Prairie Dogs

Black-tailed prairie dogs are a BLM sensitive species. A Black-tailed prairie dog town occurs on private lands on the east side of Section 33 on the East Permit. Approximately 58 acres of dog town are mapped within the Permit boundaries extending to the north and east of the Permit. The lone prairie dog colony is not known to be part of a larger complex in the area; therefore, no surveys were required by the USFWS office in Pierre, South Dakota for Black-footed ferrets.

Other Mammals

White-tailed jackrabbits and Cottontails were seen during lagomorphs spotlight surveys that were conducted on the West and East Permits in 2005 and 2006. Most populations were seen in grassland habitats. Results from the surveys showed that lagomorph populations were nearly twice as high in 2005 as in 2006, with far more jackrabbits than cottontails in both years. Declines in populations are attributed to Tularemia, a disease of lagomorphs.

Other mammals which are present on or near the Permit lands are Red fox, Bobcat, Coyote, Striped skunk, Badger, Raccoon, Porcupine, and Beaver along Crow Creek north of the Permits.

Game Birds

Game birds in the area of the Shear/ Clarkson Permits include Wild turkey, Mourning dove, and Sage grouse.

The only upland game bird species documented with any regularity during a three-year survey period was the Mourning dove. Doves were generally seen and heard in the riparian corridor along Crow Creek, although a few individuals were occasionally observed within the Permit boundaries.

Landowner, Robert Shear, reports seeing Wild turkey on occasion along the Crow Creek corridor; however, Jones & Stokes' biologists had no sightings within one mile of the Shear/Clarkson permitting area over a three-year study period.

Sharp-tailed grouse habitat occurs in brushy areas along Crow Creek although no sightings of Sharp-tailed grouse were made during the three-year study period.

Sage grouse a BLM sensitive species, depend upon sagebrush for mating, nesting, and wintering activities and grassy areas for summer broods; therefore, habitat does exist for them on the Shear/Clarkson project.

Landowner, Robert Shear, reported seeing Sage grouse in his yard (approximately 1 mile north of the Shear/Clarkson West Permit) in 2004 but had no sightings since then. Jones & Stokes' biologists had no sightings of Sage grouse within one mile of the Shear/Clarkson permitting area over a three-year study period. Most all of the east permit area is within the BLM recognized 2 mile radius for protection of nesting and brooding rearing habitat but this area has only scattered plants of sagebrush so use would be minimal.

One Sage grouse lek is present within 1 mile of the East Permit boundary, in the NE1/4 NE1/4, Section 10, T.9 N., R. 1 E. The lek has been monitored in nine of the last ten years. The highest count documented was 10 displaying males in 2003; however, average annual attendance since then has been 5 males per year. Highway 212 and the DM&E Railroad which are located adjacent to the lek are disturbance factors between the lek and ACC's proposed activity.

This population of sage grouse also is connected to the populations to the north which was determined in a recent study that showed moved north and west to this area. This certainly is a connectivity corridor for the Middle Creek population.

Disturbance of the sagebrush/grassland habitat on mine sites may cause displacement of sage grouse, although they will use the grasslands for brood rearing, especially where the vegetation is moist. Infrequent sage grouse sightings indicate a low density of sage grouse presently in the area northwest of Belle Fourche. Even though the South Dakota sage grouse population is not a high density population it is very important because it is the easternmost sage grouse population.

Other Birds

Breeding bird surveys were conducted by Jones & Stokes' biologists, and their data indicates the most abundant birds are Horned lark, Western meadowlark, Vesper sparrow, and Grasshopper sparrow. The highest density of birds was seen in the Rough Breaks habitat type with 27.3 individuals per transect, next was the Mixed Grass Prairie type with 24 individuals per

Transect, then Shrublands with 23 individuals per transect, and Prairie Dog Colony with 14.3 individuals per transect.

Raptors

Several species of raptors were observed by Jones & Stokes' biologists over a three-year period in the Shear/Clarkson study area. Most of the raptor observations were associated with nesting hawks, owls, or golden eagles.

Raptor species that were recorded foraging in or passing over the survey area included American kestrel, Northern harrier, Prairie falcon, Rough-legged hawk, Ferruginous hawk, and Bald eagle.

Winter roosting habitat for Bald eagles is present along Crow Creek, and some eagles have used it during recent winters. During roost surveys, 11 roosting eagles were recorded in January, 2006 and 4 in 2007. ACC's nearest mining (on the East Permit) will be about $\frac{3}{4}$ mile from the roost areas.

Suitable habitat for tree-nesting raptor species is seen along the Crow Creek corridor which runs north of the Shear/Clarkson permits and is approximately 1,500 feet from the West Permit and 3,000 feet from the East Permit.

No trees are present on the Shear/Clarkson Permits, thus no suitable nesting habitat for species other than ground nesters is available in the project area. Only one raptor nest was observed within the permit boundary over the three-year period when a Burrowing owl nested in the prairie dog colony in the West Permit in 2005. Despite repeated observations of the colony after 2005, no Burrowing owls have been seen there since.

Six active raptor nests were observed along Crow Creek during the study period, occupied by Red-tailed hawks, Great horned owls, and Golden eagles.

The Red-tailed hawk is the most common nesting raptor in the area along Crow Creek. At least two pairs of Red-tails successfully nested in both 2005 and 2006, while success is unknown in 2007 although at least two nests were active that year.

Great horned owls are year round residents and nest earlier than Red-tailed hawks. Consequently, they have taken over some Red-tailed nests along Crow Creek and forced the hawks to secure new nest sites. In 2005 there was one active Great horned owl nest along Crow Creek, in 2006 one failed nest, and in 2007 two active nests.

One Golden eagle nest is present in the raptor survey area for the Shear/Clarkson Permits about 0.7 mile east of the West Permit and just over a mile from the East Permit boundary.

Of the species listed above, the burrowing owl, ferruginous hawk, golden and bald eagles are BLM sensitive species.

Aquatic life

There is no water on the Shear/Clarkson Permit except for a small, shallow pond on the West Permit – this pond dries up in the summer months. Aquatic life species that may occur are aquatic invertebrates and amphibians associated with ephemeral streams and stockponds. There are no known BLM sensitive or South Dakota species of special concern located within the

project area. There may be the tiger salamander (*Ambystoma tigrinum*), great plains toad (*Bufo cognatus*), Woodhouse's toad (*Bufo wood housii*), western chorus frog (*Pseudacris triseriata*), plains spadefoot (*Scaphiopus bombifrons*), and northern leopard frog (*Rana pipiens*) within the project area. Of these species, the great plains toad and plains spadefoot are BLM sensitive species.

Threatened and Endangered Species

There are no known endangered species in the area northwest of Belle Fourche. As of July, 2007 the Bald eagle is no longer listed under the federal Endangered Species Act; however, it continues to be protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

It is frequently observed as a winter resident along the Belle Fourche River which is approximately three miles south of the Shear/Clarkson West Permit and two miles south of the East Permit. It also winter roosts on occasion along Crow Creek, north of the Shear/Clarkson permit boundary.

3.8 Cultural

The Shear/Clarkson Permit land was surveyed for cultural resources in 1997 and 2007. In 2007, Llano Consultants, completed a files search of previous surveys done on the project and conducted a Class III inventory on approximately 800 acres.

In this case the surveys resulted in the identification of 3 cultural resources (sites 39BU0442, 39BU0443, and 39BU379) and 2 isolated finds. Site 39BU0442 appears to be the remains of a homestead site consisting of 3 stone foundations and a shallow depression. In addition to the foundations and the depression a small number of historic period artifacts were located; e.g., 1 small screw topped jar, 1 tobacco can, 1 clear glass shard, 2 bridle rings, 3 shards of salt glazed earthen ware, and 4 small pieces of cut lumber. The site was evaluated as not eligible to the National Register of Historic Places (NRHP). Sites 39BU0443 and site 39BU379 are historic period trash scatters. The isolated finds consist each of a single artifact. The historic trash scatters and the isolated finds were found not eligible to the NRHP.

The results of Llano's surveys were sent to the SHPO as part of the required consultation process and the SHPO concurred with BLM's finding that no historic properties will be affected by this undertaking. Also, refer to section 1.7 Federal, State and Local Permits Or Required Consultations, subtopic, Tribal Consultation.

Should significant sites be found at a later date, a variety of mitigation measures would be utilized, ranging from data collection (excavation) to on-site protection.

3.9 Soils

A thorough investigation of the soil resources on the Shear/Clarkson Permit lands was done in 2006 by Jim Nyenhuis, Certified Professional Soil Scientist/Soil Classifier, under contract with ACC. Soils mapping and classification was conducted in accordance with the standards and procedures of the National Cooperative Soil Survey.

Soils were mapped to the detailed Order 1-2 level of intensity on all areas where proposed mining and associated disturbance will occur on the permit. Soil map unit boundaries were delineated by exposing soil profiles using a sharpshooter and bucket auger as well as observing surface conditions, vegetation, slope gradient, and slope aspect.

Thirty-four topsoil and subsoil samples were taken on the Shear/Clarkson Permit lands, and chemical analyses were performed by Inter-Mountain Laboratories, Inc., Sheridan, Wyoming. The recommended topsoil and subsoil salvage depths are based on the results of these analyses.

Penrose clay soil comprises the majority of the area to be disturbed by proposed mining. This is a shallow soil, well-drained calcareous soil forming in place from chalky shale, weathered limestone, and interbedded limy materials. Penrose is found on ridges, backslopes, sideslopes, and plains across the permit area. Recommended salvage depths for the Penrose soil are 6" for topsoil and 13" for subsoil on the Shear/Clarkson project.

Other soil types that will be affected include Kyle clay, Twotop clay, Grummit clay, and Arvada silt loam, with 10"/22", 10"/12", 6"/11", 2"/11" respectively recommended for topsoil/subsoil salvage.

There are also numerous outcrops including rock, bentonite and shale which will not be salvaged as topsoil.

3.10 Vegetation

Pre-mine vegetative community mapping on the Shear/Clarkson Permit lands was done in 2005 and 2006 by ACC personnel.

Vegetative community identification is based on a classification system designed by Stoecker-Keammerer & Associates, Ecological Consultants of Boulder, Colorado in 1987 for the northeastern Wyoming bentonite region (which extends into South Dakota).

Transition lines of the various plant communities on the permit were mapped by GPS equipment, and then 1"=400' Vegetation Maps were created for each applicable section (7 maps). Quantitative cover sampling was performed over the permit land in June and July, 2006, and plant species lists were compiled based on observations made in 2005, 2006, and 2007.

ACC's field data revealed that the major vegetative communities on the Shear/Clarkson Permits are: Mixed Grass Prairie (57% of total acreage), a Big Sagebrush/Rubber Rabbitbrush/Eriogonum (buckwheat) mixed community (19% of total acreage), Big Sagebrush Shrubland (11% of total acreage), a prairie dog town (7% of total acreage), and reclaimed grassland (4% of total acreage).

Approximately 363 acres will be affected by proposed mining activities on the Shear/Clarkson Permits and will occur primarily in the Mixed Grass Prairie community where 244.2 acres is proposed to be affected. Another 42.3 acres will be affected in the Big Sagebrush/Rubber Rabbitbrush/Eriogonum community, 14.2 acres in the Big Sagebrush Shrubland, 33.7 acres in the prairie dog town, and 23.8 acres in a reclaimed grassland community.

Inclusions of bare ground and outcrops are common throughout the Shear/Clarkson Permits and are considered to be inclusions within the main vegetation types.

The following table summarizes the vegetative community types on the Shear/Clarkson Permits:

Table 3.10-1 Shear/Clarkson Permits - Vegetative Community Sample Data

<u>Name of Community</u>	<u>Average % of Herbaceous Canopy Cover</u>	<u>Average % of Bare Ground</u>
Mixed Grass Prairie <i>West Permit</i>	23.6%	45.4%
Mixed Grass Prairie <i>East Permit</i>	27.9%	30.6%
Big Sagebrush/Rubber Rabbitbrush/Eriogonum <i>West Permit</i>	22.1%	48.3%
Big Sagebrush Shrubland <i>East Permit</i>	21.1%	56.3%
Prairie Dog Town <i>West Permit</i>	12.7%	56.9%
Reclaimed Grassland <i>West Permit</i>	20.9%	49.1%

Other smaller communities include outcrops, barrens, and disturbance along the ranch road.

No noxious weed species were observed on the Shear/Clarkson Permit lands. One noxious weed, Canada thistle, was observed in the ditch along Highway 212 in Section 11, T. 9 N., R. 1 E. ACC has an approved noxious weed plan which is used to control weeds during mining and reclamation activities.

No unusual, threatened, or endangered plant species were identified during ACC's vegetation studies.

3.11 Grazing Resources

L&S Cattle Company currently has a grazing authorization for the Crow Creek allotment. There are 49 cattle authorized to graze this allotment during the time of April through February for a total of 49 animal-unit-month (AUM). The Crow Creek allotment covers BLM in T. 10.N., R. 1 E., Section 29 for the West Permit. The allotment also covers BLM in T. 9 N., R. 1 E., Sections 2 and 3 of the East Permit.

The BLM in T. 9 N., R. 1 E., Sections 11 and 12 is currently not under authorization for grazing. The BLM is establishing an allotment and concurrent grazing authorization for the 80 acres of BLM in these 2 sections. The grazing authorization will likely be established as a year round lease with 28 AUM's on BLM land.

Using the *South Dakota Technical Guide Western* from the USDA – Soil Conservation Service, Notice SD-221, dated 1/28/88, ACC personnel figured stocking rates for the acreage to be affected by mining on the Shear/Clarkson Permit. Approximately 100 acres in “poor” condition include a prairie dog-disturbed area and areas heavy with annual brome grasses. Considering the type of range site (shallow), only 0.1 to 0.12 AUM/acre is recommended on these areas, or approximately 3.7 animal units for 3 months.

Approximately 175 acres are in “fair” condition on shallow, clayey, and dense clay range sites where there are a few decreaser plant species along with increasers and invaders. The recommended stocking rate is 0.2 to 0.25 AUM/acre, or approximately 13.4 animal units for 3 months.

Approximately 75 acres are in “good” condition on clayey and dense clay range sites where there are more decreaser species and fewer invaders. The recommended stocking rate is 0.3 to 0.37 AUM/acre, or approximately 8.8 animal units for 3 months.

Therefore, on approximately 350 acres to be affected on the Shear/Clarkson Permit (not counting ranch trails and a small shale pit), approximately 26 animal units could graze for 3 months.

3.12 Lands and Realty

3.12.1 Ownership and Land Use Authorizations

On the Shear/Clarkson West Permit there are 18 acres of land with Federal surface and Federal minerals, there are 130 acres of land with private surface and private minerals, and there are 216.1 acres of land with private surface and Federal minerals.

On the Shear/Clarkson East Permit there are 100 acres of land with Federal surface and Federal minerals, and there are 380.7 acres of land with private surface and private minerals.

See Appendix 1 for the legal descriptions of the Shear/Clarkson West Permit and East Permit and the acreages of each.

3.13 Recreation

Recreation is very limited and consists primarily of big game hunting and perhaps a very small amount of bird hunting. Hunting is restricted on the private lands in the area and there is no legal access to the public lands. There are no trees on the permits, and water resources are limited to one small, shallow dugout on the Shear/Clarkson West Permit.

3.14 Visual Resources

The BLM has developed the Visual Resource Management System (VRM) to classify visual resources based on scenic quality, visual sensitivity, and visual distance zones. Although the area is currently undesignated as to VRM class, the inventory class in 2008 was class 4 but may change when final planning decisions are made via the RMP planning process which is currently underway.

The landscape is dominated by short grass prairie, scattered sagebrush and rabbitbrush, cactus, bentonite outcrops, and barren shale ridge slopes and is similar to surrounding land northwest of Belle Fourche. There are no trees on the Shear/Clarkson Permits.

3.15 Noise

Existing noise in the general area of the Shear/Clarkson Permit results from daily traffic on Highway 212 and the DM&E Railroad which is located just south of the West and East Permit boundaries.

Noise, as perceived by humans, is affected by intensity, pitch, and duration. Loudness is measured in decibels (dB), whereas the A weighted sound scale (dBA) represents environmental noise. Mining activities are typically subject to noise regulations imposed by the Mine Safety and Health Administration (MSHA). Noise generated by trucks, dozers and other mine equipment typically ranges from 90 to 100 dBA at the source. For comparison, a gas lawnmower at 3 feet would register about 95 dBA, and a jet flying over at 1,000 feet would register about 105 dBA.

3.16 Transportation

Access to the Shear/Clarkson mine sites will be from existing Highway 212 approaches near the south boundaries of the permits.

Bentonite hauling shuts down during inclement weather and during some months, but when active, there may be 50 or more loads per day hauled from ACC's South Dakota mine sites. Some loads will go to the Colony plant in Wyoming and some will go to the Belle Fourche plant depending on the quality of the clay. Like mining, hauling activity is projected to occur for less than 30 days per year on the South Dakota projects.

3.17 Social and Economic Conditions

The main industries providing employment in Butte County are agriculture, forestry, fishing and hunting and mining (19.4%), educational, health, and social services (18%), and retail trade (12.7%).

The bentonite companies have been a major industry in the Belle Fourche, South Dakota; Colony, Wyoming; and Alzada, Montana area for many years. Colony is located approximately 22 miles northwest of Belle Fourche, and Alzada 36 miles northwest of Belle Fourche.

The first company to begin mining in the Belle Fourche area was the Schundler Company in 1929 (which was later sold to Baroid Division, National Lead Company). ACC's bentonite plant at Belle Fourche was constructed in 1935. Currently ACC has plants at Belle Fourche and Colony, and a competitor bentonite company, Bentonite Performance Minerals (formerly known as Baroid), has a plant at Colony.

In 2006 the population of Belle Fourche was estimated to be about 4,757 residents, a 4.2% increase over 2000 figures. Butte County, where Belle Fourche is located, had an estimated population in 2006 of 9,374 residents, up 3% from the 2000 census. This indicates a population density of approximately 1 person per $\frac{1}{4}$ square mile for the county. The area is expected to slowly gain population with overflow from towns in the northern Black Hills, namely Spearfish and Deadwood.

In 2005, in Butte County, 24.4% of the residents were under the age of 18, and 15.4% were age 65 or older.

ACC has 43 employees at its Belle/Colony Field operations and another 190 employees at the Belle Fourche and Colony plants and mills. These employees are dependent on the local bentonite production as are contract truckers who haul the bentonite.

Most of ACC's employees commute from Butte and Lawrence Counties, South Dakota, and Crook County, Wyoming. According to the U.S. Census Bureau data on county to county commuting patterns in 2000, of 3,482 workers listed in Butte County, 190 commute from Lawrence County, 122 from Meade County, and 26 from Crook County, Wyoming.

The number of Butte County employees covered by Unemployment Compensation Insurance was 2,403 in 2002 according to the U.S. Bureau of Labor Statistics. In 2006 the unemployment rate in Butte County was 2.9%, compared to the U.S. average of 4.6%.

The average weekly wage for ACC employees in the three state area (Montana, Wyoming, South Dakota) was more than \$800 in 2002. The U.S. Bureau of Labor Statistics reported the average weekly wage was \$400 in Butte County, South Dakota and \$484 in Crook County, Wyoming in 2002.

ACC produced 16,300 tons of bentonite from its South Dakota operations in 2006. The company did not mine bentonite in South Dakota in 2007 as operations were active instead in the Colony, Wyoming and Alzada, Montana areas. It is proposed that mining on the Shear/Clarkson project will be active less than 30 days a year for the 10-year permit life.

Mining on the Shear/Clarkson Permits will not cause ACC to change the numbers of employees in its work force. The field crew will simply shift operations to the South Dakota site for a short period of time and then go back to the Colony or Alzada mine sites.

ACC has surface and mineral leases with some of the area ranchers. Private landowners receive royalties and/or surface damage payments. ACC also has active mining claims on the federal lands. The Federal Government receives a \$125 per claim Maintenance Fee and there are no production royalties.

South Dakota has no income tax but does have sales tax. South Dakota, Wyoming, and Montana levy property taxes on plants and equipment. ACC's annual payroll for 200 employees in 2002 in the tri-state area was 10.1 million dollars. In addition, ACC paid vendors 11.3 million dollars.

3.18 Environmental Justice

Executive Order 12898, Environmental Justice, requires that Federal agencies "identify and address the . . . disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." BLM has developed an instruction memo containing guidance for evaluating environmental justice issues in land use planning (IM No. 2002-164).

According to federal statistics, the 2005 population of Butte County, SD was 96.5% White, 3.1% Hispanic, 2.0% American Indian, .2% Asian, and .2% black.

3.19 Mineral Resources and Geology

Bentonite clay is a fine-grained rock composed mainly of montmorillonite minerals. The formation of bentonite is an in situ alteration of volcanic ash. Pyroclastic material was ejected into the atmosphere by volcanic activity and deposited as sediment in a marine environment. The resulting alteration of volcanic ash is the material we call bentonite.

Bentonite has unique chemical and physical properties and is called “the clay of 1000 uses”. The principal markets for bentonite include metal casting for the formation of sand molds, iron ore pelletizing, well drilling, clumping cat litter, pharmaceutical and cosmetic industries, pelletizing aids in animal feeds, carriers for agri-chemicals, etc. Environmental products include liners for landfills, waterproofing panels, ground water products, bentonite-based flocculents to remove emulsified oils and heavy metals from waste water, bentonite-based grout, and many others.

Bentonite deposits in the Northern Black Hills mining district includes parts of Butte County, South Dakota, Crook County, Wyoming, and Carter County, Montana. The overall geologic structure of the district is that of a broad northwestward-plunging anticline, in which the strata dip gently toward the northeast, north, and northwest. The overall structure is interrupted, however, by several subordinate folds, which bring the bentonite beds to the surface repeatedly, so that large resources of bentonite are present under light overburden (Knechtel, 1962).

Mining on the Shear/Clarkson Permits will consist of surface mining for bentonite clay located in the F bentonite bed which passes through the property in a broad belt. The F bed is the uppermost stratum of the lower member of the Belle Fourche Shale formation. These strata formed during the Lower and Upper Cretaceous periods (Table 3.19-1).

In order to reach the F bentonite bed, ACC will mine through a portion of the Belle Fourche Shale formation, which consists of dark-gray fissile shale with manganiferous siderite (iron rock) concretions and isolated portions of lenses of sandy shale and sandstone. Bed F is overlain and underlain by shale. Depth of the overburden in the areas of proposed mining ranges from about 2 feet to 50 feet. The thickness of the bentonite seam averages about 3 feet on the Shear/Clarkson Permits.

Mining on the Shear/Clarkson Permits will affect only the Belle Fourche Shale formation, which is not considered to be geologically unique.

TABLE 3.19-1 STRATIGRAPHIC COLUMN OF THE TERTIARY, MESOZOIC, AND PART OF THE PALEOZOIC SEDIMENTS IN THE MONTANA AND WYOMING PORTIONS OF THE POWDER RIVER BASIN

ERATHEM	SYSTEM, SERIES, AND OTHER DIVISIONS		POWDER RIVER BASIN, MONTANA AND WYOMING		
CENOZOIC	Quaternary		Alluvium		
	Tertiary	Pliocene			
		Miocene			
		Oligocene			
		Eocene	Wasatch Formation	White River Formation	
		Paleocene	Fort Union Formation	Tongue River Member	
Lebo Shale Member					
Tullock Member					
MESOZOIC	Cretaceous	Upper	Hell Creek Formation		
			Fox Hills Sandstone		
			Lewis Shale	Pierre Shale	
			Mesaverde Formation		
			Cody Shale	Niobrara Formation	
				Carlile Shale	
			Frontier Formation	Greenhorn Formation	
				Belle Fourche Shale	
			Mowry Shale		
		Lower	Muddy Sandstone	Newcastle Sandstone	
			Thermopolis Shale	Skull Creek Shale	
			Inyan Kara Group	Fall River Formation	
				Lakota Formation	
	Jurassic	Morrison Formation			
		Sundance Formation	Upper Part		
			Lower Part		
		Gypsum Spring Formation			
	Jurassic (?) or Triassic (?)	Chugwater Group or Formation			
	Triassic	Goose Egg Formation	Upper part	Spearfish Formation (Upper part)	
Lower Part			(Lower part)		
	Permian		Minnekahta Limestone		
			Opeche Formation		
PALEOZOIC	Pennsylvanian	Tensleep Sandstone		Minnelusa Formation	
	Mississippian	Amsden Formation			
		Madison Limestone	Madison Group		

From USDI FEIS (2003)

Chapter 4

Environmental Consequences

4.1 Introduction

The anticipated direct and indirect impacts of the Proposed Action and Alternatives are discussed in this chapter. For each resource, potential mitigation measures and residual impacts are also described. Cumulative impacts are described for those resources for which a direct or indirect impact has been identified. As stated in 40 CFR 1508.7 “. . . cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”

Potential mitigation measures are identified, where necessary, in response to anticipated impacts of the Proposed Action. Mitigation measures can be required by BLM as a condition of approval (Decision Record) and are implemented by incorporating them into the Plan of Operations. Residual impacts are those impacts remaining after implementation of mitigation measures. Cumulative effects result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions.

4.2 Assumptions and Analysis Guidelines

In order to evaluate potential environmental impacts resulting from the Proposed Action and any other long range future actions, the agencies evaluate the potential mining development of the mine areas using existing levels of development, a mine plan developed by ACC for the Shear/Clarkson Permits as well as a Reasonably Foreseeable Development (RFD) scenario for long term future development.

The duration of the possible impacts is analyzed and described as short-term or long-term; short-term is up to 5 years and long-term is 5 to 20 years.

The RFD area is regarded by BLM as lands that might contain some potential for future mining and could be permitted within the next 10 to 15 years by ACC. The lands are largely unexplored, there are no mine plans drawn at present, and the RFD represents a best guess scenario as to what lands could be mined in the future. The RFD will be used solely to allow BLM to analyze the cumulative (future) impacts in the area.

The impact analysis is based on previous events, experience of personnel and their knowledge of resources in the area.

4.2.1 Assumptions Common to All Alternatives and Resources

4.2.1.1 Past and Present Developments (Existing)

ACC, with offices located in Belle Fourche, South Dakota, opened their local bentonite mining operation in 1935. In 1971 the first mining law in South Dakota was passed, and ACC's Permit #6 was granted at that time. In 1982 the mining laws were revised, and the South Dakota Mined Land Reclamation Act went into effect in July of that year. ACC then updated Permit #6 with the State. ACC acquired existing Permits #29 and #312 from International Minerals & Chemical

Corporation in 1988. Beginning in July, 1993 ACC has permitted additional lands under Permits #458, #459, #461, #463, #465, and #469.

As active areas are mined out, reclaimed, and released from bond, they are removed from the permit. To date, 219.4 acres have been removed from Permit #6, and Permits #458, #459, #461, and #463 have been dropped altogether.

ACC currently has the following acreages under permit in South Dakota for a total of 7,447.02 acres (Table 1.1);

Permit #6	6,469.52 acres
Permit #312	240.00 acres
Permit #29	400.00 acres
Permit #465	85.50 acres
<u>Permit #469</u>	<u>252.00 acres</u>
Total	7,447.02 acres

Since the South Dakota mining law went into effect in 1971, approximately 583.8 acres have been disturbed within ACC's current permit boundaries. A total of 510.11 acres have been fully released from bond, 356 acres of which had been disturbed by mining. Therefore about 939 acres of permitted lands have been disturbed in South Dakota. Of the 583.8 acres of disturbance about 524.9 acres have been reclaimed through the seeding stage, and about 58.9 acres are currently under some phase of mining. About 1,101.28 acres within the current permit boundaries are administered by BLM; of this, 62.7 acres have been disturbed and reclaimed.

Approximately 259 acres of the Shear/Clarkson Permits are currently contained in ACC's Permit #6; however, because Permit #6 is over 25 years old and because it allowed for no technical revisions and the mine plan has changed, these lands are being repermited with DENR.

4.2.1.2 Proposed Action and Reasonable Foreseeable Development

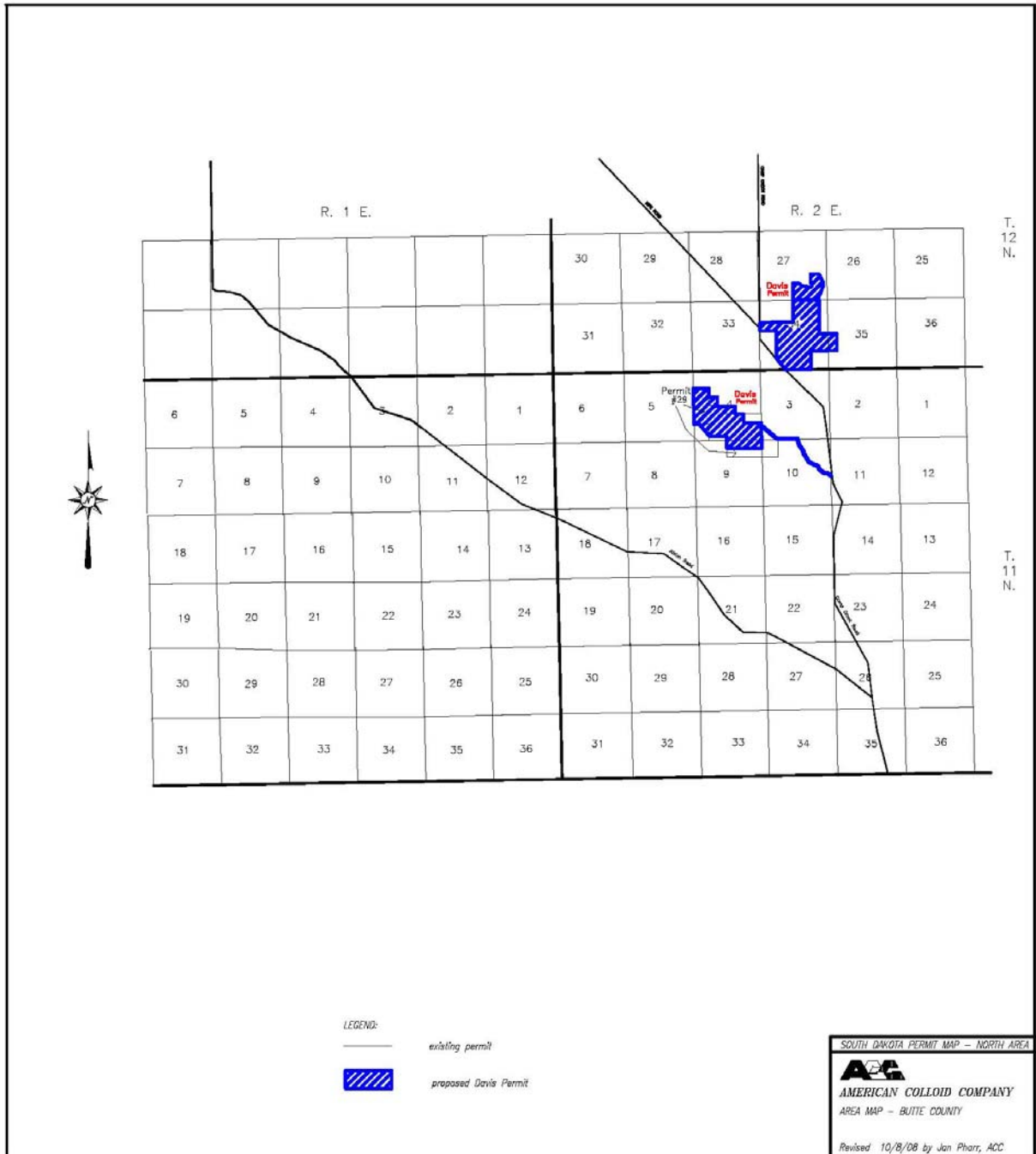
The Shear/Clarkson Permits, if approved as submitted, would increase the amount of ACC's permitted land in South Dakota by 844.8 acres (118 acres Federal and 726.8 acres private surface ownership).

The disturbed area in the Permits, which would include mined areas plus mine-related disturbances such as haul roads and stockpiles etc., would total approximately 363 acres over a 10-year, or less, life of the mine.

The RFD area would involve adding about 800 acres of private surface and mineral on the Tom Davis Ranch which is located 16-20 miles north of Belle Fourche. This would include repermirting some of old Permit #29 lands. See Figure 4.1.

Mining and reclamation could occur on about 25% (200 acres) of the RFD land. These acreages are a rough estimate, "best guess" scenario based on limited exploration drilling. As bentonite reserves are identified and mine plans are developed, acreages will change.

Figure 4.1 Reasonably Foreseeable Development Scenario



4.3 Topography

4.3.1 Proposed Action, Direct and Indirect Impacts

The proposed action will result in alteration of the existing landscape during mining of the area. During reclamation activities, the affected land will be contoured to blend in with the surrounding topography, and generally slopes will be no steeper than 5:1, which will help provide stabilization against wind and water erosion.

Bentonite on the proposed mine sites averages 3 feet thick; however, the reduction in elevation will be generally less than the thickness of the bentonite seam removed because of overburden swelling. Post-mine contours will approximate the original contours except where blended into the ridge.

The restored land surface will have less topographic diversity than before mining. Reduction of topographic diversity can reduce vegetation and habitat diversity, which can result in a reduction of wildlife carrying capacity in restored areas for some species.

A smoother surface will increase the surface water run-off rates after precipitation events, thereby increasing the erosion on reclaimed soils. A flatter surface will allow for greater infiltration of precipitation.

4.3.1.1 Proposed Action, Cumulative Impacts

The proposed action would add approximately 363 acres to disturbed land totals in Butte County, South Dakota. This will result in more land with gentler slopes and lower topographic diversity to that which already has been impacted by mining. This impact would be a permanent affect to the landscape. It would also include those impacts that might occur sometime in the future at the RFD mine site. It is estimated about 200 acres might be disturbed out of about 800 acres that could be permitted.

4.3.2 Alternative A (No Action), Direct and Indirect Impacts

The additional impacts to the topography on federal lands as described in the proposed action would not occur, but permitted mining areas would continue to be impacted until currently permitted reserves are exhausted.

4.3.2.1 Alternative A (No Action) Cumulative Impacts

The cumulative impacts to topography would include those described for mining currently existing permitted reserves but would not include impacts for the proposed action on federal lands because it would be denied under this alternative. It would include those impacts (200 acres) that might occur sometime in the future at the RFD mine site.

4.3.3 Mitigation

Additional mitigation for topographic impacts would not be necessary.

4.4 Air Quality

4.4.1 Proposed Action, Direct and Indirect Impacts

Fugitive dust generated by wind erosion on the moderate to severely susceptible soils would elevate total suspended particulates (TSP) on an average background concentration of $15 \mu\text{g}/\text{m}^3$; this would continue on a long-term basis. Land treatments would increase surface exposure and raise fugitive dust concentrations to about $30 \mu\text{g}/\text{m}^3$ over the short term, until vegetation is well established. Increased vegetative production would have a positive effect on reducing fugitive dust generation from wind erosion. Chemical control of noxious weeds could produce very localized, short term, virtually unmeasurable impacts to air quality by drifting in and around the treatment areas.

Bentonite mining and hauling activities are a source of particulate and gaseous emissions. Fugitive dust emissions are generated by mining, hauling and stockpiling operations. Gaseous air pollutants include sulfur dioxide (SO_2), carbon monoxide (CO), oxides of nitrogen (NO_x) and volatile organic compounds (VOC). The source for these emissions is the diesel-fueled engines used to power mining equipment and haul trucks. All of the emissions from mining bentonite are fugitive emissions emitted at ambient temperature with no momentum. These emissions are not expected to impact visibility or air quality to a measureable degree.

4.4.1.1 Proposed Action, Cumulative Impacts

True cumulative impacts to air quality are extremely difficult to quantify and are probably negligible. As mining occurs in the proposed area, mining in other areas will cease and reclamation will begin. Reclamation is conducted nearly concurrently with mining so as new mine areas are opened up previously mined areas are recontoured and revegetated. Thus the impacts from blowing dust particles and emissions is of short duration. There would be some small amount of cumulative impact from mine area to mine area but only over the short term until the mining and reclamation cycle is complete. Similar impacts would result from mining the RFD area sometime in the future

It is unlikely that direct air quality impacts from the proposed action will violate any local, state, tribal or federal air quality standards.

4.4.1.2 Mitigation

Dust emissions are partly mitigated by intermittent dust suppression of the haul roads and concurrent reclamation.

4.4.2 Alternative A (No Action), Direct and Indirect Impacts

Since the proposed additional mining on the ACC on federal lands would not take place, additional impacts to air quality beyond those already expected in currently permitted mining would not occur.

4.4.2.1 Alternative A (No Action) Cumulative Impacts

The cumulative impacts would be slightly less than those described for cumulative impacts under the proposed action. This is because not as much land would be mined thus, shortening the duration of impacts under this alternative.

4.4.2.2 Mitigation

Concurrent reclamation, revegetation and road watering for dust suppression all serve to mitigate for air quality impacts.

4.5 Hydrology

4.5.1 Groundwater, Proposed Action, Direct and Indirect Impacts

Bentonite mining rarely occurs at depths sufficient to contact groundwater. When exploratory bentonite drilling does occasionally encounter shallow groundwater, it is usually a perched water table. The perched water tables are usually not of sufficient quantity to provide livestock or domestic use but may produce small wet areas high on the ridges. These areas are avoided by mining because of the high cost to recover the clay in wet areas.

During the mining procedure, a small amount of bentonite is usually left insitu. The small amount of bentonite left in the excavated pit, impedes downward migration of waters from the overlying reclaimed land and may re-establish the perched groundwater and the subsequent wet areas on the ridges at the bentonite outcrops.

Based on the data that no significant groundwater is known to exist above the deepest projected depth of mining and there is no known aquifer recharge area within the mine area, it is not anticipated that groundwater will be impacted.

4.5.2 Surface Water, Proposed Action, Direct and Indirect Impacts

During active mining operations, water quality will decline slightly due to an increase in total suspended solids (TSS) during storm events and snowmelt. Because of the diversion around the mine and borrow ditches along the haul roads, the water picks up more sediments and other dissolved solids running through constructed ditches and diversions than it normally would flowing across the native prairie. However, sediment control measures taken by ACC and the filtering action of the offsite vegetation as the run-off water leaves the disturbed area, helps to reduce the water quality impacts. Therefore, the proposed action would cause additional sedimentation during mining activities but concurrent reclamation will tend to minimize it.

Only ephemeral drainages will be affected by actual mining activity. Alteration of flow patterns of ephemeral drainages occurs during mining by redirecting flow around the active mine site, which is typically 2-4 acres. Location and courses of ephemeral drainages are re-established during the reclamation process.

Water quantity from the reclaimed areas will not be noticeably reduced as a result of mining. The reclaimed land will have gentler slopes, which tends to reduce surface run-off rates by increasing infiltration rates. However, because of the high clay content the soils tend to seal over relatively quickly, reducing the infiltration rates.

Small pits may be left for stockwater but these will retain runoff from relatively small areas, less than 30 acres, therefore the changes at an intermittent drainage will not be measurable. No stockwater needs have been identified on BLM lands, therefore no small pits will be left on BLM lands.

4.5.2.1 Surface water, Proposed Action Cumulative Impacts

For the most part, the actual mine related impacts to water quality and quantity described above are short term, mostly contained or minimized by sediment control programs and do not add much to cumulative impacts resulting from bentonite mining in the project area. The small amount of increased sediments that leave the area could possibly add to the general sediment load of the Belle Fourche River drainage system. This very small amount of increased sediment load would combine with the sediment load resulting from unreclaimed pre-law mining (these lands lie a few miles south of Highway 212) in the Crow Creek drainage system before it empties into the Belle Fourche River. The increased sediment load resulting from past and present mining are not currently quantified and can only be described in a general sense.

Post-mine reclamation of the land may actually enhance the long-term surface water quality because post-mine vegetative cover often exceeds that of the native vegetation, which will decrease erosion, thereby increasing water quality. On lands that ACC has permitted in South Dakota, approximately 939 acres have been disturbed by mining, of which 510 acres have been released from bond and 524.9 acres have been reclaimed through seeding, resulting in a reduction of sedimentation.

Disturbed acres, along with haul roads and spur roads, will continue to contribute suspended and dissolved solids to run-off waters until fully revegetated. The proposed action and future mining at the RFD area would cause additional sedimentation during mining activities; however, concurrent reclamation will tend to minimize it. However, the RFD area is not in the Crow Creek drainage and thus extra sediment from mining would not combine with any pre-law mining sediments in that drainage system.

Stockponds are sometimes constructed by ACC during the reclamation process at the request of the landowner. In addition to enhancing the water resources for livestock grazing, these stockponds also provide wetland habitat for wildlife and serve as a sediment filtration system, improving the quality of run-off water. In accordance with DENR rules, the necessary stockpond permit will be secured for all permanent stockponds that are constructed during the reclamation phase.

4.5.3 Surface Water, Alternative A (No Action), Direct and Indirect Impacts

Under the no action alternative the impacts described under the proposed action would still occur only to a lesser degree because mining would still occur on the currently permitted lands.

4.5.3.1 Surface Water, Alternative A (No Action), Cumulative Impacts

The impacts under this alternative would be very similar to the cumulative impacts described for the proposed action except would occur to a slightly lesser degree because less land would be disturbed.

4.5.4 Mitigation

ACC holds a storm water discharge permit from the State of South Dakota that requires best management practices (BMP's) to control the amount of sediment leaving the site. Surface flow will be diverted around the upslope side of mining operations by constructing v-ditches and/or berms with a patrol/blade. Water will be channeled within the original watershed to lessen the effect on water distribution in the area. Controlling run-on will reduce water run-off

from disturbance areas, minimizing potential pollution due to suspended and dissolved solids. Sediment control devices will be employed where run-off threatens to carry sediment to undisturbed lands.

Water originating from disturbed lands where topsoil has been removed will be directed into small catch basins wherever possible to allow the heavier sediments to remain within the limits of the disturbed area. These sediment traps will be about 12 feet wide and 20 feet long and approximately 2-3 feet deep. They will be placed at logical low points around the disturbed perimeter where water would be expected to exit. The traps will be maintained on a regular basis so they do not become overfilled with sediment.

No drainage will be blocked by stockpiling of overburden or soils. If excessive erosion occurs within a diversion, sediment pits, rows of straw bales, sediment fences, and/or water bars will be installed.

Reclamation operations will include removal of all temporary diversions and reestablishment of through drainage. No perennial or intermittent streams will be disturbed by the mining operations. Only ephemeral drainages will be disturbed by mining activity, and these drainages will be re-established after mining. Reconstructed channels will slope 1% or less for the purpose of minimizing water velocity to reduce erosion. Flat-bottom trapezoidal channels will be designed according to watershed size, peak flow, and velocity calculations. If topography is not conducive to maintaining 1% grade, steep slope channel design practices will be employed, such as installing rip-rap or rolled erosion control products.

Generally, ephemeral channel construction will consist of a flat, scraper width (12 foot) bottoms that will meander as much as possible. The goal will be to approximate original pre-mine channel cross section and to minimize erosion.

In all reconstructed channels, seeding will be done perpendicular to water flow to reduce erosion, and water bars and/or straw bales may be installed to encourage meandering within the channel. wheatgrass may be added to the standard seed mix where applicable for erosion control and wildlife cover.

4.6 Wetlands

4.6.1 Proposed Action, Direct and Indirect Impacts

There are no wetlands identified on the project area, and no new ponds are currently planned. However, it is possible that a landowner could request that a pit be left as a stockwater pond which could eventually be classified as a wetland.

4.6.1.1 Proposed Action, Cumulative Impacts

Ponds have been constructed throughout mined areas on some of ACC's permits. These were constructed primarily for livestock water sources, but also serve to benefit other species by providing a continual source of water. Some ponds have also been left as a legacy resulting from unreclaimed, pre-law mining. These ponds are also used by wildlife and livestock and now contain emergent vegetation in some areas. Although no ponds are currently being proposed, one or more could be constructed on private lands sometime in the future if requested by the landowner.

4.6.2 Alternative A (No Action), Direct and Indirect Impacts

The impacts expected for this alternative are the same as those described for the proposed action.

4.6.2.1 Alternative A (No Action), Cumulative Impacts

The impacts expected for this alternative are the same as those described for cumulative impacts under the proposed action.

4.6.3 Mitigation

No additional mitigation is required.

4.7 Wildlife

4.7.1 Proposed Action, Direct and Indirect Impacts

Direct Impacts

Direct impacts to wildlife resources include loss of habitat through construction activities, location of infrastructure (haul roads, mine pits, etc), and mortalities resulting from collisions with vehicles. A number of small animals, such as small mammals and reptiles, which cannot quickly leave the area may be destroyed by the mining operations.

The proposed action would add 844.8 acres to ACC's plan of operations, of which approximately 363 acres would be disturbed by mining operations and related activities. This is a direct temporary loss of wildlife habitat (both forage and cover). Successful reclamation would stabilize disturbed sites and attempt to restore disturbed areas to pre-disturbance conditions. Reclamation will not always recreate pre-disturbance values. Changing a shrub-grassland with intermingled forbs, to an environment characterized by a dominance of grasses, would affect those species of wildlife, which are sagebrush obligates by reducing vital habitat and forage. Some species of passerine birds, some small mammals and reptiles, as well as sage grouse and pronghorn antelope would be affected by this change. However, due to the minimal amount of sagebrush cover on the Shear/Clarkson Permits pre-mine, the temporary loss of habitat should not affect the long term viability of these species in the project area. In addition, wildlife surveys associated with previous mining operations show relative low and stable wildlife populations.

Removal of shrubs during mining will decrease forage availability and reduce the winter carrying capacity of sagebrush areas. Reclamation activities will restore forage vegetation (grasses and forbs) in a relatively short period of time (1-3 years). Forbs generally are slower to re-establish than grasses. Forbs will also tend to re-establish naturally. Vegetation that is suitable for wildlife cover (shrubs) will require a longer period of time. As shrubs begin to grow in reclaimed areas, they too are primarily available in the summer months as forage, and until they grow into mature plants, able to provide hiding and thermal cover (10-30 years).

Vehicle traffic on the proposed haul road spurs between the Shear/Clarkson mine sites and Highway 212 could result in the increase in collision-related mortalities to all wildlife species. The most notable species that could be impacted include pronghorn, upland and passerine birds, small mammals and reptiles/amphibians. These additional mortalities would not have a noticeable impact on the local populations of the species affected.

No known threatened or endangered wildlife species will be affected by ACC's operations. No critical habitats for wildlife species are present or will be affected by mining.

Indirect Impacts

Indirect impacts from development actions occur to wildlife species that are sensitive to human activities, require large blocks of uniform cover, or are displaced by other species or individuals of their own species. In addition to the 363 acres that would be directly disturbed, surrounding land could become less suitable because of the nearby mining and associated human activities, although this activity would occur occasionally through the year, not daily.

Similar habitat is available in immediately adjacent areas, and will be used by those animals mobile enough to leave when mining operations begin. Some redistribution of pronghorn, mule deer, upland game birds, such as sage grouse, non-game birds, and some small mammals will occur during mining as they are displaced to adjacent lands. Some additional competition will occur between displaced wildlife and species already inhabiting non-project habitats, but that level is difficult to measure.

About 60% of the wildlife habitat that is included in the Shear/Clarkson Permits proposal would not be directly impacted. However, indirect effects of the mining activity would include changes to traditional use and movement patterns, disruption to normal foraging and reproductive habits, and increased energy expenditure by most wildlife species in the project area. The species most impacted by habitat fragmentation include those with larger home ranges, such as big game, upland birds and raptors. Passerine and other neotropical migrant birds are impacted by interruptions to preferred nesting habitat, improved habitat for undesirable competitors such as brown-headed cowbirds and increased potential for predation. The pre-mine grassland/shrub habitats have a low density and diversity of non-game bird species. The amount of displacement by mining will be minimal. Mining will be outside woodlands, riparian habitats, or wetlands where higher bird densities are found.

Red-tailed hawks, Great horned owls, and Golden eagles nest north of the Shear/Clarkson Permit boundaries, along the Crow Creek corridor. Some active nests are within 1 mile of the Permit boundaries. A ridge which runs through the West and East Permit lands will help create a visual and physical buffer between active nests and mining activity. Mining activities could shift nesting to suitable habitat and nesting areas along Crow Creek further from mining activity, but it should not have an appreciable effect on the raptors because of the abundance of nesting sites along the creek.

A portion of the prairie dog town which is located in the West Permit will be directly affected by mining, and this could affect species associated with prairie dog towns (i.e., mountain plover, burrowing owl). However, prairie dog habitat extends north and east of the Permit boundaries here as the colony has grown larger in recent years.

Impacts to the one Sage grouse lek in the area are expected to be minimal. The lek is located about 1 mile from proposed mining on the East Permit and about 3,000 feet from where the proposed haul road spur will enter Highway 212 at an existing approach. The highway and DM&E railroad offer a disturbance factor between ACC's proposed activities and the lek. Grouse activity has been observed at the lek even as the train is going by. As with any disturbance, some wildlife species and individuals, including big game, can and would acclimatize to a sustained and regular human contact providing that contact is not perceived as

threatening. Many of the small mammal species are disturbance tolerant and quickly re-establish their populations on reclaimed land.

Aquatic life

There are no known threatened or endangered aquatic life species (or their habitats) that will be affected by ACC's operations.

One small, shallow dugout is located on the West Permit, but it is outside proposed mining activity. Minimal effects may occur to any aquatic life associated with the stock pond. Effects would be small since animals do not become solely dependent on this water source, since any water here dries up in the summer months.

At its nearest point, mining on the West Permit will be approximately 1,500 feet from Crow Creek; mining on the East Permit will be approximately 3,000 feet from Crow Creek.

Crow Creek is classified as marginal for warm water fish life propagation; however, baseline water samples show that total suspended solids (TSS) exceed the standards for a marginal warm water fishery. The high TSS levels may be attributed to active erosion along the streambank and livestock use. (DENR, 2003)

Minimal effects may occur to aquatic life located downstream in Crow Creek primarily attributed to increased suspended sediment and dissolved solids. However, appropriate erosion control measures will lessen this effect.

Minimal effects may occur to aquatic invertebrates and amphibians within the project area. This is due to the displaced habitat caused by mining in ephemeral drainages. These species will most likely migrate to other suitable habitats. All of the disturbed habitat within the project area will be reclaimed after the mining is completed.

4.7.1.1 Proposed Action, Cumulative Impacts

The cumulative impacts on wildlife habitat would include past present and future disturbances to the landscape. That would mean that on ACC's active South Dakota mining permits, approximately 939 acres of vegetation have been disturbed to date, and an additional 363 acres would be disturbed under the proposed action for a total of 1299 acres of disturbance. The RFD could include another estimated 200 acres of disturbance for a total potential long term disturbance of 1,499 acres. It is unknown how many acres of habitat have been disturbed by pre-law mining activities. However, it must be noted that of the 939 acres of disturbance to date about 510 acres have been fully reclaimed and released from bond and another 524 acres have been reclaimed through the seeding stage. Therefore a large portion of the total disturbance acreage is available for wildlife use.

Cumulative impacts to wildlife would include wildlife injuries and mortalities, and the loss of additional habitat. Habitat loss would increase from mining activities. Reclamation would not always recreate pre-disturbed conditions or values over the short term. However, over the long term, the reclaimed areas would approach pre-mine compositions as additional native species reestablish themselves in the areas.

Indirect cumulative impacts would include disturbance to, or displacement of, certain wildlife species from human activities, habitat loss, and potential changes in animal behavior and movement patterns.

It is likely that mining the RFD area would add to the impacts described above. However, over the long term the impacts described above would be reduced to near background levels once the habitat is fully restored by reclamation and reinvasion of natural plant species.

4.7.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative the federal lands would not be disturbed. The impacts would be similar to those described under the proposed action but would occur to a slightly lesser degree because fewer acres would be disturbed.

4.7.2.1 Alternative A (No Action), Cumulative Impacts

Under this alternative the impacts would be very similar to those described for the cumulative impacts under the proposed action but would occur to a slightly lesser degree because fewer acres would be disturbed.

4.7.3 Mitigation

The approved reclamation plan will eventually restore the land to near pre-mine conditions and will support wildlife and livestock uses. Financial guarantees for reclamation ensure that reclamation will occur. Other mitigation such as erosion control and concurrent reclamation help minimize impacts to wildlife during active mining and reclamation activities.

4.8 Cultural Resources

4.8.1 Proposed Action, Direct and Indirect Impacts

The project area and the project's Area of Potential Effect has been adequately surveyed for cultural resources by Llano Consultants in 1997 and 2007 (Savini, John F. 1997, 2007). No cultural resources that are eligible for the National Register of Historic Places were located by the cultural inventories. Consequently, no cultural resources considered eligible for the National Register of Historic Places would be impacted or affected by the proposed undertaking.

4.8.1.1 Proposed Action, Cumulative Impacts

It is unknown at present if cultural sites were impacted or destroyed by prelaw mining. Present day mining on federal and private lands must have a cultural survey prior to being authorized to mine. Therefore, if important sites were found they would be avoided or mitigated. No important sites requiring mitigation have been discovered. With survey and mitigation requirements in place, it is unlikely that any important sites will be adversely impacted in the future.

4.8.2 Alternative A (No Action), Direct and Indirect Impacts

Under the No Action alternative there would be no additional surface impacts on the federal land. Therefore there would be no impacts to cultural features beyond those that will occur from mining currently permitted reserves under this alternative.

4.8.2.1 Alternative A (No Action), Cumulative Impacts

The impacts to cultural resources under this alternative would be essentially the same as those described for cumulative impacts under the proposed action.

4.8.3 Mitigation

If important sites are found in the future, a variety of mitigation measures could be utilized to mitigate the impacts to the sites, ranging from data collection (excavation) to on-site protection to avoidance.

In the event that buried cultural resource values are located during earth disturbing activities, the disturbance must stop and the BLM must be notified. The BLM will then take appropriate action to recover, protect and or mitigate impacts to the site.

The operator is also responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts

4.9 Soils

4.9.1 Proposed Action, Direct and Indirect Impacts

Disturbance of the existing soil horizons occurs during removal and replacement of the topsoil and subsoil. This activity results in alteration of the in situ soil fabric. Bulk density of soil horizons is reduced, increasing the available water capacity. This reduction in density lessens with time, and does not appear to have any negative effects. The temporary increase in available water capacity assists the revegetation process.

The proposed action requires all usable topsoil to either be salvaged and stockpiled or applied directly to contoured areas. Best management practices are utilized to insure minimum erosion from the stockpiled soils and overburden. Topsoil piles and direct-applied areas will be seeded to protect them from erosion. However, some soil will be lost to wind and water erosion until vegetation is re-established. This loss should be minimal depending on the intensity, frequency and duration of erosion-producing events.

The post-mining soils will be replaced at a more uniform depth than the pre-mine soils were found. The soil replacement depth in the areas proposed for mining will be 0-10 inches for topsoil and 0-22 inches for subsoil, based on pre-mine soil studies. This will have a beneficial impact on areas that had little or no topsoil prior to mining. Rock, bentonite and shale outcrops support little or no vegetation and will not be salvaged as topsoil. Vegetation is often spotty due to soil chemical and physical characteristics in these areas.

Pre-mine, clay hard pan soils allow little water penetration and will be benefited by being broken up by dirt-moving equipment; it will be possible to establish vegetation on areas that were sparsely vegetated before mining.

The reclaimed lands will have gentler slopes than pre-mine, which will reduce surface run-off rates and increase infiltration rates. Replaced soils should support a stable and productive vegetative cover capable of sustaining post-mining land uses, which include livestock grazing and

wildlife habitat. Therefore, potential impacts to the soil resources on the Shear/Clarkson Permits will not be adverse.

4.9.1.1 Proposed Action, Cumulative Impacts

The cumulative impacts on soils, as described above, would include past present and future disturbances to the landscape. That would mean that on ACC's active South Dakota mining permits, approximately 939 acres of soils have been disturbed to date, and an additional 363 acres would be disturbed under the proposed action for a total of 1,299 acres of disturbance. The RFD could include another estimated 200 acres of disturbance for a total potential long term disturbance of 1,499 acres. It is unknown how many acres of soils have been disturbed by pre-law mining activities. However, it must be noted that of the 939 acres of disturbance to date about 510 acres have been fully reclaimed and released from bond and another 524 acres have been reclaimed through the seeding stage.

Topsoil impacts have been and would be mitigated by various methods as described below. Also, impacts would not occur all at one time due to concurrent reclamation and the transitory nature of the mining operations. Therefore, the overall long term harm to soils from mining Bentonite is relatively low.

4.9.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative the impacts would be similar to those described under the proposed action except fewer acres would be disturbed. Mining would still occur on those acres that are currently permitted.

4.9.2.1 Alternative A (No Action), Cumulative Impacts

The impacts under this alternative would be similar to those described under cumulative impacts for the proposed action except to a slightly lesser degree because fewer acres would be disturbed. Mining would still occur on currently permitted lands.

4.9.3 Mitigation

Topsoil is salvaged prior to mining. Some is stockpiled and some is direct hauled to previously mined areas. Both stockpiled and direct hauled soils are planted as soon as possible in accordance with the appropriate planting season. Therefore vegetation is quickly established to protect the soils.

Reclamation is conducted concurrently with mining thus enabling direct hauling of topsoil to previously backfilled areas. Direct hauling of topsoil promotes quicker vegetative establishment, reducing potential soil erosion by wind and water. Material not suitable for vegetative growth is placed beneath the root zone, improving vegetative growth and productivity.

In addition, ACC's mining operation is and will be bonded by both the BLM and State of South Dakota. The bonds will not be released until satisfactory reclamation is achieved.

4.10 Vegetation

4.10.1 Proposed Action, Direct and Indirect Impacts

During the stripping operations, there will be a loss of vegetation and potential for increased erosion until vegetation is re-established. Reclamation activities will be conducted concurrently with mining on the backfilled pits and immediately following mining. This means that all the mine sites will not be stripped of vegetation at any one time, and seeding will be conducted each spring or fall on the lands that have been prepared for seeding.

Most of the reclaimed land will be seeded with a grass/forb mixture that is perennial and self-sustaining without the use of fertilizers or irrigation. Since 1988, ACC has included Winter wheat in the seed mix as a nurse crop at the individual species application rate of 10 pounds of pure live seed (PLS) per acre. This practice has demonstrated that the nurse crop concept works well in controlling erosion and weed invasion. Within three years after the initial seeding, little evidence is seen of wheat as the planted species become established.

The difference in vegetation species between undisturbed and disturbed lands would impact various wildlife species until shrubs and forbs on adjacent native land can become established on the reclaimed land. Reintroduction of these species may be quicker on areas where topsoil is direct-hauled ("livespread"). Soils not stockpiled tend to have more live microorganisms, microrhizal fungi, rhizomes, live seeds, and even live plants.

Seeded grasslands can provide valuable wildlife habitat because, as discussed in the wildlife section, big game animals will concentrate on grassland species during the spring and summer months, and small mammals are suited to a variety of habitats.

There are no known threatened or endangered plant species within the study area; therefore, there should be no impacts to these species.

Evidence of mining and reclamation will remain for the long term until vegetation and erosion return the area to equilibrium with the surrounding environment.

4.10.1.1 Proposed Action, Cumulative Impacts

The cumulative impacts on vegetation, as described above, would include past present and future disturbances to the landscape. That would mean that on ACC's active South Dakota mining permits, approximately 939 acres of vegetation have been disturbed to date, and an additional 363 acres would be disturbed under the proposed action for a total of 1,299 acres of disturbance. The RFD could include another estimated 200 acres of disturbance for a total potential long term disturbance of 1,499 acres. It is unknown how many acres of vegetation have been disturbed by pre-law mining activities. However, it must be noted that of the 939 acres disturbed to date, about 510 acres have been fully reclaimed and released from bond and another 524 acres have been reclaimed through the seeding stage.

All the lands would be contemporaneously reclaimed as mining takes place and seeded with native species. Therefore, only a small portion of the total mine area would be bare ground at any one time. Many different stages of vegetative establishment will occur on the mine area over time ranging from fully revegetated to newly seeded areas. The mined lands will eventually reach a level of restoration which will approximate pre-mine levels of vegetation.

4.10.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative the impacts would be similar to those described under the proposed action except fewer acres would be disturbed. Mining would still occur on those acres that are currently

permitted.

4.10.2.1 Alternative A (No Action), Cumulative Impacts

The impacts under this alternative would be similar to those described under cumulative impacts for the proposed action except to a slightly lesser degree because fewer acres would be disturbed. Mining would still occur on currently permitted lands.

4.10.3 Mitigation

Erosion control, seeding plans and grazing modifications described in this document are sufficient mitigation to help offset impacts to vegetation.

4.11 Grazing Resources

4.11.1 Proposed Action, Direct and Indirect Impacts

During the mining and the reclamation process, BLM lands within the proposed action will be unavailable for livestock uses, and livestock grazing will be excluded through the construction of a fence placed around reclaimed areas that conforms to BLM criteria. The BLM will modify the grazing activities through the grazing decision process specified within the Title 43 CFR 4160 to suspend the AUMs within the proposed action.

Mining on the Shear/Clarkson Permits will result in the suspension of up to 34 AUMs within the L&S Cattle Co. lease, and the Clarkson lease once it is established. The actual AUMs suspended will be commensurate with the area of BLM land disturbed or fenced off from grazing.

After two growing seasons, the BLM will utilize an interdisciplinary team process to determine the applicability of permitting livestock grazing on the reclaimed BLM lands. If the interdisciplinary team determines that livestock grazing will not impair rangeland health standards, then the BLM will coordinate with the permittee to activate the suspended use. Once an application has been completed, the BLM will issue grazing decision(s) as described above to place the suspended use into active use that is available for livestock grazing.

On private lands not tied to the Federal AMP, ACC typically reaches a grazing agreement with the landowner, or the reclaimed land is fenced to protect the site from livestock grazing for 2-3 years until the perennial grasses are established.

The reclamation plan is designed so that the affected lands are stabilized and will support both livestock grazing and wildlife after mining.

4.11.1.1 Proposed Action, Cumulative Impacts

The cumulative impacts on vegetation (grazing resource) are fully described in the vegetation section above. It is assumed that over time, the amount of forage on the above described acres was and will be incrementally unavailable for grazing. However, it is doubtful that the gradual vegetation loss has had or would have any important overall impacts to livestock grazing.

BLM lands that are removed from grazing will continue to accrue as new areas are mined and reclaimed until such time as BLM determines that the reclaimed lands can be returned to grazing use. It is anticipated that the AUM's affected will be continually adjusted over the years as mining and reclamation progress. Ultimately mining will cease and the grazing practices will return to normal.

4.11.2 Alternative A (No Action), Direct and Indirect Impacts

If the federal lands aren't mined then grazing on those lands would not be impacted. Impacts to grazing would only occur on the lands that are already permitted for mining.

4.11.2.1 Alternative A (No Action), Cumulative impacts

If the federal lands aren't mined then grazing on those lands would not be impacted. Impacts to grazing would only occur on the lands that are already permitted for mining. The impacts under this alternative to those currently permitted lands, would be similar to those described under cumulative impacts for the proposed action.

4.11.3 Mitigation

Mitigation includes reseeding, revegetating and fencing the disturbed areas in a timely fashion so that they can be returned to grazing activity as soon as possible.

4.12 Lands and Realty

4.12.1 Land Use Authorizations and Ownership, Proposed Action, Direct and Indirect Impacts

The proposed action will not have any direct or indirect impacts to the land use authorizations or land ownership beyond those described above for grazing practices.

4.12.1.1 Land Use Authorizations and Ownership, Proposed Action, Cumulative Impacts

The proposed action will not have any cumulative impacts to the land use authorizations or land ownership beyond those described above for grazing practices.

4.12.2 Land Use Authorizations and Ownership, Alternative A (No Action), Direct and Indirect Impacts

Alternative A, the no action alternative, will not have any direct or indirect impacts to the land use authorizations or land ownership beyond those described above for grazing practices.

4.12.2.1 Land Use Authorization Ownership, Alternative A (No Action), Cumulative Impacts

Alternative A, the no action alternative, will not have any cumulative impacts to the land use authorizations or land ownership beyond those described above for grazing practices.

4.12.3 Mitigation

No mitigation is needed for the land use authorizations or land ownership beyond those described above for grazing practices

4.13 Recreation

4.13.1 Proposed Action, Direct and Indirect Impacts

The area is not a high-use recreation area. Recreation use consists primarily of big game hunting and bird hunting although hunting is restricted on the adjoining private lands thus there is no public access to the Federal lands. Mining operations temporarily remove small acreages, which has a minor impact on big game distribution. Existing ponds in the area will not be affected by mining operations. As new areas are mined, other areas are being reclaimed with some land reaching full vegetative restoration each year. This provides additional habitat for displaced big game and opportunity for hunting.

In addition, mining is sporadic and may or may not occur during hunting seasons.

4.13.1.2 Proposed Action, Cumulative Impacts

The impacts would essentially be the same as those described above except more land will be opened up to vehicular access to those hunters who have permission to hunt or cross the adjacent private lands. This could improve the chances of success for hunters who prefer to hunt from vehicles.

While the vehicular access would be opened up to cover more land as the road network expands, the recreational hunting experience could be diminished for some hunters due to the altered nature of the landscape and mining activity. The topography will be permanently altered but would eventually become less noticeably altered as the areas become revegetated. These impacts would also occur on the lands subject to mining in the RFD area.

Stockponds, which have been created on some mine sites have added areas for hunting ducks and geese. No stockponds will be created on BLM lands.

These impacts would diminish with time when mining ceases and the land is fully reclaimed.

4.13.2 Alternative A (No Action), Direct and Indirect Impacts

The impacts would be nearly the same as described above for the proposed action, since mining would occur on lands that are already permitted.

4.13.2.1 Alternative A (No Action), Cumulative Impacts

The cumulative impacts would be nearly the same as described above for cumulative impacts under the proposed action as mining would occur on currently permitted lands.

4.13.3 Mitigation

The reclamation features incorporated into the mine plan and in this document will all contribute to mitigating impacts to the landscape and thus eventually return recreational opportunities back to normal at some time in the future.

4.14 Visual Resources

4.14.1 Proposed Action, Direct and Indirect Impacts

The proposed mining activity will modify the landscape by creating changes in line, form, color, and texture. In the short term, new temporary landforms will be created, which include stockpiles, pits and haul roads. Permanent changes to landforms will also occur. After reclamation is complete, the topography will generally be more subdued with gentler, vegetated rolling hills replacing sharper, partially vegetated ridges or bare knobs.

Highway 212 is located along the south boundary of the Shear/Clarkson Permit, therefore, impacts from ACC's mining operations will be visible to motorists on the highway and ranchers in the area. At times, haul trucks from the mine will also be entering and leaving the highway at that location further drawing attention to the mining activity. However, once mining activity ceases and the areas are fully reclaimed it would be difficult for the casual observer to determine that the areas had once been mined.

Activities will meet at least the Class 3 objectives in order not to preclude a higher class designation. Class 3 objectives include partial retention of the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

4.14.1.1 Proposed Action, Cumulative Impacts

As described above, permanent changes to the landscape will occur but over the long term visual impacts from recent mining and mining under the proposed action would become negligible. The RFD north of Belle Fourche could include another estimated 200 acres of disturbance that would occur sometime in the future but that too would become a rather negligible visual impact over the long term. However, the pre-law mining located south of Highway 212, which is visible from the highway will not be reclaimed in the foreseeable future.

4.14.2 Alternative A (No Action), Direct and Indirect Impacts

The impacts to the landscape, as described under the proposed action would occur on lands that are already permitted but the impacts to the federal lands which are subject to this plan of operations would not happen.

4.14.2.1 Alternative A (No Action) Cumulative Impacts

The cumulative impacts to the landscape under this alternative would be similar to those described above in the cumulative impact section, except the impacts to the federal lands which are subject to this plan of operations would not occur.

4.14.3 Mitigation

Current reclamation practices are sufficient to mitigate visual impacts to the landscape. If visual impacts ever become a major issue in this area then methods such as limiting pit size to 5 acres, limiting open pits to 15 acres per area, and rehabilitating older areas as new areas are opened could be considered.

4.15 Noise

4.15.1 Proposed Action, Direct and Indirect Impacts

Noise, which results from the mining operation is within acceptable ranges for workers. Noise level measurements are taken periodically by MSHA (Mine Safety & Health Administration) and no citations have been issued to ACC for exceeding noise limits. The noise impact would be minimal for the nearest residents which are approximately 0.5 to 0.75 mile from the nearest proposed mining.

4.15.1.1 Proposed Action, Cumulative Impacts

There will be no cumulative impacts related to noise as no new additional mining equipment is proposed to be used and the proposal does not represent an increase in production rates.

4.15.2 Alternative A (No Action), Direct and Indirect Impacts

Under the no action alternative, current levels of noise will continue at the usual and customary times that they occur until existing permitted mine lands are mined out.

4.15.2.1 Alternative A (No Action) Cumulative Impacts

There would be no cumulative noise impacts from this alternative.

4.15.3 Mitigation

Additional mitigation is not required.

4.16 Transportation Facilities

4.16.1 Proposed Action, Direct and Indirect Impacts

Access to the Shear/Clarkson West Permit and East Permit mine sites will be approximately 7 to 12 miles northwest of Belle Fourche at existing approaches of Highway 212. Hauling directly onto Highway 212 would represent a shift in the location of truck traffic currently hauling from other mine sites.

The bentonite will be hauled by contract haul trucks. It is estimated that hauling on the Shear/Clarkson projects could occur for less than 30 days per year. Throughout any given year, hauling shifts from the Colony, Wyoming area to the Alzada, Montana area to the South Dakota area, as dictated by customer clay needs; therefore, the above number represents the status quo, and additional haul truck traffic from the proposed action is not anticipated.

4.16.1.1 Proposed Action, Cumulative Impacts

There would be no important cumulative impact to traffic resulting from the proposed action. This is because the mining and resulting haul truck traffic will just shift from one mine location to another. There will not be additional haul truck traffic as a result of the action. Past mining would not contribute to traffic impacts in a cumulative sense.

The road surface of Highway 212 between the mine sites on Shear/Clarkson and the processing plants at Belle Fourche, South Dakota or Colony, Wyoming probably receives a higher level of wear and tear due to the accumulated heavy truck traffic resulting from all mining. However, it is not possible to document or quantify this supposition.

4.16.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative, the federal lands would not be mined but current transportation impacts would continue as described above until current and future permitted reserves are exhausted.

4.16.2.1 Alternative A (No Action) Cumulative Impacts

Under this alternative the impacts would be the same as those described under the cumulative impacts for the proposed action.

4.16.3 Mitigation

Proper traffic control and safety signs should be installed on Highway 212, at or near the new access points. This should include signs advising motorists of trucks entering the highway as well as a stop sign for the haul trucks at the highway entry points.

4.17 Social and Economic Conditions

4.17.1 Proposed Action, Direct and Indirect Impacts

ACC's proposed action will result in the continued production of bentonite at current levels in the near term. Employment levels, wages, expenditures and taxes paid in the Tri-state area would continue. Thus the proposed action represents the status quo.

During the course of this analysis, no alternative considered resulted in any identifiable effects or issues specific to any minority or low income population or community. The agency has considered all input from persons or groups regardless of age, race, income status, or other social or economic characteristics.

4.17.1.1 Proposed Action, Cumulative Impacts

It is difficult to quantify the total economic and social impacts from past present and future mining that have occurred in the area. However, it is safe to assume that the Belle Fourche South

Dakota area has benefitted economically over the years from bentonite mining. Expansion of the mine into the unexplored areas west and north of the existing operation would extend the economic impacts described above into the future for as long as the proposed action lasts and at least until the RFD area has been mined out. However, this does not represent an increase in production but rather a shift in mine areas and a continuance of current production rates.

4.17.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative the clay under the federal lands would not be mined. That does not necessarily mean that the remaining clay under private lands would not be mined. However, it does mean that the value this clay represents to the mine and community would be lost.

4.17.2.1 Alternative A (No Action) Cumulative Impacts

The social and economic impacts from past present and future bentonite mining would continue to accrue minus the economic benefit of mining the clay under the federal parcels.

4.17.3 Mitigation

Mitigation is not required.

4.18 Mineral Resources and Geology

4.18.1 Proposed Action, Direct and Indirect Impacts

Bentonite reserves, which lie within 50 feet of the surface, will be removed by ACC's activities on Shear/Clarkson Permits. This represents an irretrievable commitment of the resource. Once it is mined, processed and shipped, that bentonite is lost to future users.

4.18.1.1 Proposed Action, Cumulative Impacts

Mining of the bentonite, past, present, and future represents an irretrievable commitment of the resource. Once it is mined, processed and shipped, that bentonite is lost to future users. Certain grades of bentonite, which are not considered mineable at this time or bentonite that is deeper than 50 feet may be mined in the future, if economically feasible. Once these reserves are used up, the company would have to discover more, re-mine bypassed ore or close the mines.

4.18.2 Alternative A (No Action), Direct and Indirect Impacts

Under this alternative, the bentonite reserves underlying the federal lands in the project area would not be developed. Theoretically, it would be available for future users if economic conditions allowed for mining the small amount of reserves represented by this bypassed clay. The mining of currently permitted lands would continue until reserves are depleted. That bentonite would be lost to future users.

4.18.2.1 Alternative A (No Action) Cumulative Impacts

The impacts under this alternative would be similar to those described under the Proposed Action for cumulative impacts except that the clay reserves under the federal surface in the project area would not be mined.

4.18.3 Mitigation

Additional mitigation is not needed.

Chapter 5

List of Preparers

5.1 Preparers

Dan Benoit	Geologist, Project Lead - Minerals, Geology, Topography, Hydrology
Russ Pigors	Physical Scientist – Soils, Air, Hazmat and NEPA
Chuck Berdan	Biologist – Wildlife, Land Use
Thad Berrett	Rangeland Management Specialist - Grazing and Vegetation.
Gary Smith	Archeologist - Cultural
Elizabeth Stiller	Recreation Planner – Recreation, VRM
Gerald Moller	Range Technician - Weeds
Joan Trent	Sociologist –Sociology
Ed Hughes	Economist - Economics

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- www.fedstats.gov for U. S. Census Bureau data
- www.quickfacts.census.gov for U. S. Census Bureau data

APPENDIX 1

Legal descriptions:

Shear/Clarkson West Permit

Township 10 North, Range 1 East
South Dakota

	<u>Acres</u>	<u>Surface Owner</u>	<u>Mineral Owner</u>
<u>Section 28</u>			
80' strip along trail in S2SW4	3.3	F.L. Clarkson Ltd.	BLM
<u>Section 29</u>			
200' roadway strip in S2NE4NW4	2.1	L&S Cattle	BLM
200' roadway strip in SE4NW4	4.6	L&S Cattle	BLM
SW4NE4	40.0	L&S Cattle	W2 BLM; E2 ACC
SW4SE4NE4	10.0	L&S Cattle	L&S Cattle, Smith Family Mineral Trust, & McLeod Scientific LLC
NW4SE4	40.0	L&S Cattle	W2 BLM; E2 ACC
NE4SE4	40.0	L&S Cattle	ACC
E2E2SE4SW4, N of Hwy 212	7.2	BLM	BLM
N2SW4SE4	20.0	L&S Cattle	BLM
NW4SE4SE4	10.0	BLM	BLM
80' strip along trail in NE4SE4SE4	0.8	BLM	BLM
<u>Section 33</u>			
80' strip along trail in N2NW4	1.4	F.L. Clarkson Ltd.	BLM
S2SE4NW4NW4	5.0	F.L. Clarkson Ltd.	BLM
SW4NE4NW4 & E2NE4NW4	30.0	F.L. Clarkson Ltd.	BLM
NW4NE4	40.0	F.L. Clarkson Ltd.	F.L. Clarkson Ltd, John J. or Robert L. Nikodym
W2SW4NW4, N of Hwy 212	14.8	L&S Cattle	BLM
NE4SW4NW4	10.0	L&S Cattle	BLM
N2SE4NW4	20.0	F.L. Clarkson Ltd.	BLM
a portion of S2SE4NW4, N of fence	7.8	F.L. Clarkson Ltd.	BLM
SW4NE4	40.0	F.L. Clarkson Ltd.	BLM
NE4NE4SW4, N of fence	0.3	F. L. Clarkson Ltd.	BLM
N2NW4SE4, N of fence	16.8	F.L. Clarkson Ltd.	BLM
TOTAL ACREAGE WEST PERMIT	364.1		

Shear/Clarkson East Permit

Township 9 North, Range 1 East
Butte County, South Dakota

	<u>Acres</u>	<u>Surface Owner</u>	<u>Mineral Owner</u>
<u>Section 2</u>			
NW4NW4	40.0	L&S Cattle	L&S Cattle, Broadhurst Ranch
a portion of the SW4NW4	18.2	L&S Cattle	L&S Cattle, Broadhurst Ranch
SW4SE4NW4	10.0	F.L. Clarkson Ltd	F.L. Clarkson Ltd, John J. or Robert L. Nikodym
NE4SW4	40.0	L&S Cattle	L&S Cattle, Broadhurst Ranch
W2NW4SE4	20.0	BLM	BLM
NE4NW4SE4SW4 & NE4SE4SW4	12.5	L&S Cattle	L&S Cattle, Broadhurst Ranch
SW4SE4	40.0	L&S Cattle	L&S, Broadhurst Ranch, Butte County Commissioners
SE4SE4	40.0	F.L. Clarkson Ltd.	F.L. Clarkson Ltd, John J. or Robert L. Nikodym
<u>Section 3</u>			
NE4NE4	40.0	L&S Cattle	L&S Cattle, Broadhurst Ranch
<u>Section 11</u>			
SE4NE4NW4	10.0	L&S Cattle	L&S Cattle, Broadhurst Ranch
a portion of the NW4NE4	23.1	L&S Cattle	L&S Cattle, Broadhurst Ranch
NE4NE4	40.0	BLM	BLM
E2SE4NW4, N of Hwy 212 Ranch	13.9	L&S Cattle	L&S Cattle, Broadhurst
a portion of the NW4SW4NE4	1.6	L&S Cattle	L&S Cattle, Broadhurst Ranch
a portion of the SE4NE4	21.4	L&S Cattle	L&S Cattle, Broadhurst Ranch, Butte County Commissioners
<u>Section 12</u>			
NW4NW4	40.0	BLM	BLM
SW4NE4NW4	10.0	John J. and Glenda Nikodym	John J. or Robert L. Nikodym
SW4NW4	40.0	ACC	ACC
W2SE4NW4	20.0	John J. and Glenda Nikodym	John J. or Robert L. Nikodym
TOTAL ACREAGE EAST PERMIT	480.7		